

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—35TH YEAR. SYDNEY, SATURDAY, SEPTEMBER 11, 1948.

No. 11.

Table of Contents.

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—	Page.	CORRESPONDENCE—Continued.	Page.
An Address—The Continuing Conquest of Disease, by F. M. Burnet	281	Standards at the University of Sydney Medical School	305
The Death of Dr. Samuel Johnson, by F. W. Simpson	286	A Plea for Summaries	305
Urinary Stress Incontinence in Women, by A. R. H. Duggan	286	Tinted Spectacles	305
The Value of Physical Medicine in Modern Treatment, by Leigh T. Wedlick, M.R.C.P.	291	An Opening at Carrum Downs	305
REPORTS OF CASES—		Progress in Pædiatrics	305
Congenital Absence of One Kidney, by K. M. Bowden	293	Cancer	305
REVIEWS—		Other Ways of Doing Things	306
Modern Psychiatry in Practice	295	POST-GRADUATE WORK—	
Hearing Aids and Audiometers	295	The Post-Graduate Committee in Medicine in the University of Sydney	306
Anatomy and Physiology and Causes of Disease	296	NAVAL, MILITARY AND AIR FORCE—	
BOOKS RECEIVED	296	Appointments	306
LEADING ARTICLES—		ROYAL COLLEGE OF SURGEONS OF ENGLAND—	
Headache	297	Primary Fellowship Examination	306
CURRENT COMMENT—		MEDICAL PRIZES—	
Post-Embryonic Bone Growth	298	Shorney Prize	307
Hyperplasia of Renal Origin	299	OBITUARY—	
ABSTRACTS FROM MEDICAL LITERATURE—		Hugh Corbett Taylor-Young	307
Ophthalmology	300	Arthur Chenery	307
Oto-Rhino-Laryngology	301	Michael Potiris	308
BRITISH MEDICAL ASSOCIATION NEWS—		James Chambers Craig	308
Scientific	302	NOMINATIONS AND ELECTIONS	308
Notice	303	MEDICAL APPOINTMENTS	308
MEDICAL SOCIETIES—		NOTICE—	
The Australasian Association of Psychiatrists	303	Council for Scientific and Industrial Research Information Service	308
CORRESPONDENCE—		The Twelfth British Congress of Obstetrics and Gynaecology	308
Primitive Blood Transfusions	303	DIARY FOR THE MONTH	308
Fibrocystic Disease of the Pancreas: A Review of Fourteen Cases	304	MEDICAL APPOINTMENTS: IMPORTANT NOTICE	308
An English Report on the Remuneration of Consultants and Specialists	304	EDITORIAL NOTICES	308

An Address.

THE CONTINUING CONQUEST OF DISEASE.¹

By F. M. BURNET.

From the Walter and Eliza Hall Institute of Medical Research, Melbourne.

My theme tonight is infectious disease—or rather some limited aspects of that very broad subject. But my reason for accepting the invitation to give the public address is not so much to tell an interesting story of how some infectious diseases have been virtually overcome as to indicate the importance to medicine of the scientific approach. Quite soon I hope Perth will take its place as a centre of medical education—and with that development it must accept the responsibility of taking its share in the advancement of medical science.

In what I have to say there will be a good deal about the activities at the Hall Institute where I have worked now for twenty-five years. An Englishman or an American would be quite correct in saying that I am going to give far too much prominence to Australian work and especially to work from my own Institute. But I have two good reasons. One is just the normal human weakness of believing that what interests me profoundly is necessarily important. The second is in order that I can point to some effective research work done in Australia in a laboratory that is an integral part both of the Melbourne University and of a great teaching hospital. I hope that you will bear in mind this general application of what I have to say.

¹Delivered at the Australasian Medical Congress, British Medical Association, Perth, on Wednesday, August 18, 1948.

Infectious disease is part of the pattern of things as they are. Through all history famine, pestilence and war have been the major causes of untimely death. Just as important, though little noticed in history, has been the enormous mortality amongst infants and children from infectious disease in every country and at every period before the development of modern hygiene. So it has been accepted that the conquest of infectious disease—the prevention of untimely death—is one of the major objectives of modern science. It is an objective that has been pursued with the fullest cooperation of every class of every nation and of every religion, and the measure of success has been great.

It is my task to tell something of that story as it concerns almost the last of the infectious diseases to be brought under control, those caused by the viruses. The great epidemic diseases are seven in number, malaria, plague, cholera, smallpox, typhus, yellow fever and influenza. Others have had episodes of widespread activity, but these seven have been the great killers. Three are due to viruses, yellow fever, smallpox and influenza, and it is with these three that I shall deal.

Let me first say something about each of these diseases as it manifested itself at its peak of intensity.

Yellow Fever.

The story of yellow fever is the story of the slave trade between Africa and America. Its origins are still a matter of controversy, but I shall adopt the view that it evolved in the African jungles. There it was and still is a trivial disease of the monkeys in the tree tops, carried from one to another by jungle mosquitoes. Negroes in these regions would generally be infected in childhood, when for some reason yellow fever is a very mild disease, and thereafter be immune for life.

But in the towns of the coastal regions of Africa and in the ports of America and the West Indies there was another mosquito which was very apt at the transfer of

yellow fever from one human being to another, and about 1650 we hear of the first undoubted epidemic of yellow fever at Barbados in the West Indies. From that time onwards there is an almost continuous story of outbreaks in Central America and on the West Coast of Africa, with periodic extensions northward reaching as far as Lisbon on the one side and New York on the other side of the Atlantic.

Yellow fever epidemics vary in their intensity, some being little worse than influenza, but in others the disease may have a terrifying mortality. In its typical form the virus multiplies in the liver; there is acute fever, prostration and delirium, and the two notable symptoms of the disease, the yellow-tinged skin and the vomiting of blood, are both results of the liver damage.

It was characteristic of yellow fever that those who had lived since childhood in the regions of its prevalence were virtually immune. Its impact was not upon the native but upon the stranger and especially upon the European soldier. It is perfectly correct to say that the extensive military activities in the West Indies during the Napoleonic wars were dominated by yellow fever. Haiti was the graveyard first of a British army and then of one of Napoleon's finest armies in 1800. The fantastic black dictatorship of Christophe was made possible only by yellow fever. In Jamaica in the first years of the nineteenth century, British troops had a death rate of 15% *per annum*, the vast majority from yellow fever. Most of you will know how the first attempt to build a Panama Canal by de Lesseps collapsed into utter failure and bankruptcy under the combined onslaught of malaria and yellow fever.

Smallpox.

Smallpox, too, has played a notable part in history. It appears to have been an ancient disease in China and India, but there is no clear evidence of its existence in Europe before the fifteenth century. The physicians of the Renaissance knew about smallpox from the Arabic literature before they experienced it in their own countries.

The beginning of the sixteenth century marks the real impact of smallpox on western history. Around that time appear references to cases in English noble families, and from then on there is evidence of a steady slow increase in incidence until it reached such a level that one might almost speak of the great towns of Britain being saturated with smallpox. When Charles II came back to England in 1660 he lost a brother and a sister within a year from the disease, and it is reasonably accurate to take the next one hundred and forty years till 1800 as a period in which smallpox was as widespread as measles is today. Whenever a community is subject to the continuous presence of an infectious disease which gives rise to a lasting immunity against a second attack, the incidence of the disease is on the young. More than 90% of smallpox deaths in the eighteenth century were in children under five years of age.

At the same time as a mild form of smallpox was beginning to appear in England, the same disease was making possible Cortez's conquest of Mexico. One must never forget how extremely important infectious disease has been in the military campaigns—and in the ordinary life of the people for that matter—in the past. The Spanish conquest of Mexico would probably have been impossible but for the fact that the Spaniards were either already immune or much less susceptible to smallpox than the Aztecs.

In 1519 Cortez landed in Mexico; his lieutenant, Narvaez, joined him from Cuba where smallpox was already epidemic, bringing with him negro slaves. One of these sickened and initiated the disastrous history of smallpox in America. The epidemic spread throughout the Aztec empire and the neighbouring civilizations of Guatemala and Yucatan. With its long incubation period of ten to twelve days, during which an infected but still healthy individual can travel long distances in his flight from an infected community, smallpox is diabolically adapted to ravage an entire civilization where there is no immunity in the population. No one knows what the death roll was, but the best estimates were of three million deaths in

the years of the conquest—more than half the native population. Sickness and death, of course, produced famine; the death of Montezuma's successor and other rulers brought disorganization and panic. A great civilization disappeared within a decade and smallpox was implanted permanently on the continent. Right up to the end of the nineteenth century it continued to play a major part in the destruction of the natives, the Red Indians of the north, the Mexicans, the South American natives and, most completely of all, the Caribs of the West Indies. On a small scale the same sort of process seems to have taken place amongst the Australian aborigines. Smallpox was reported amongst the aborigines near Sydney soon after the first settlement, but there is nothing to show how far it spread or what mortality resulted.

But from our own point of view smallpox is chiefly interesting as it affected our own ancestors in the cities of Britain during its heyday, the eighteenth century. The analogy with present day measles that I have already drawn gives the clearest picture of the situation. In London, smallpox was a nearly universal disease of childhood, always present but flaring up into more acute epidemics every few years. In the country, epidemics were patchy and when they occurred involved adults as well as children. And just as nowadays country recruits to military camps tend to show a rather high incidence of rather severe measles, so in the eighteenth century the young man from the country coming to London had a very good chance of dying of smallpox.

Influenza.

Influenza has a very different story. The great epidemics of smallpox and yellow fever, as of plague and typhus, are things of the past as far as civilized urban communities are concerned. Influenza is probably at least as old as human civilization, but it was more of a nuisance than a menace until the great epidemic of 1918-1919. That, as Greenwood has said, was one of the great plagues of human history, comparable only with the plague of Justinian's reign that ravaged the Roman Empire in the fourth century and the Black Death of the fourteenth century.

In earlier centuries influenza was almost a subject for mirth; it was so trivial compared with the more serious diseases of the times. Creighton exemplifies the attitude by the remark of an eighteenth century physician about a contemporary epidemic: "Everybody ill, nobody dying, splendid!" There is a characteristic flippancy about the popular names for influenza during the seventeenth and eighteenth centuries. Memories being short it was usually called the "new disease", but one epidemic became known as the "gentle correction", another as the "new acquaintance". The very name influenza itself, "the influence", has a flippant undertone and, according to Creighton, "la grippe" originally meant merely the current craze or fashion.

There were many widespread epidemics of influenza before 1918, and each of them, then as now, was associated with an increased mortality amongst babies and old people. It is usual to speak of the epidemic of 1890-1892 as something similar to that of 1918-1919. This is a mistake. The 1890 epidemic was in all probability "ordinary" influenza which in England involved a community that had for some reason been virtually free from influenza for forty-three years. In 1918 the disease took on a new quality that has never been satisfactorily explained: it killed not the baby and the old man, but the young adult in the prime of life. I do not wish to say much about the great pandemic, though its history provides many fascinating epidemiological problems.

It seemed to start in the west of France in the late spring of 1918, gathered way and swept over Europe during the summer in a relatively mild form, but even then, when it killed, it killed mainly young adults. Then in August something happened, perhaps a mutation of the virus to greater virulence, and a great wave of mortality swept over the world. It reached Australia in February, 1919. It is interesting that Tasmania was, as far as I know, the last part of the world to be reached,

and apart from a few isolated places like New Caledonia and Saint Helena which missed the pandemic completely, it was the region which showed the lowest mortality from the disease.

The total death roll was of the order of twenty-five million, a big proportion being Asiatics. In most countries of European stock the death rate was about five per 1000. The mortality was perhaps not as high as we tend to remember it. Of each 1000 people in the community, about 250 had an attack of influenza; 200 of these had just ordinary influenza over in a few days, the other 50 would show signs of pneumonia and of the 15 to 20 persons with severe pneumonia five would die. It was the extraordinary extent of the epidemic that was responsible for the vast mortality.

After 1919 the great epidemic dwindled, but for two or three years the virus obviously remained active, giving rise to patchy epidemics in various parts of the world. There is some evidence, that not until 1929 did influenza revert completely to its ordinary form.

It is no secret that a similar great outbreak of influenza was feared and expected during World War II. It is still not easy to say why it did not appear.

I have tried to sketch for you brief pictures, of these three "captains of the men of death" as they flourished in the past. I am certain that I have not really touched your imagination, for apart from influenza no major epidemic has afflicted Australia, western Europe or northern America within living memory. Neither you nor I have seen cases of confluent smallpox with the whole skin a festering mass or watched men die with the black vomit of yellow fever. And unless civilization breaks down I do not think we ever shall. A few months ago I heard the man who probably knows more about infectious disease than anyone else in Australia make a remark that impressed me very greatly. He was Dr. Frank Scholes, and what he said was simply: "We have seen the last of the great fever hospitals." In the future we should be capable of dealing with infectious disease in our stride as it were, and be able safely to use the bed capacity of the fever hospitals for general hospital work.

To have reached that stage is the greatest achievement and the greatest change in human living that ever marked a century.

Let us look at the way in which this was accomplished, using as a sample of the process recent research on the three virus diseases, yellow fever, smallpox and influenza.

I am going to tackle this story in a highly unorthodox fashion. In essence I want to trace how our own work at the Hall Institute comes into relation with these diseases. If at times this seems too much of a personal account, I can only remind you of my opening statement that I am more concerned in giving you my sense of the importance of research in medicine than in presenting a picture of present day knowledge of virus diseases.

Research on Influenza.

I shall commence with influenza, which of the three is the subject that I am most competent to discuss. Although I was not a member of the team concerned I was a member of the staff at Hampstead when Laidlaw, Andrewes and Smith first isolated the virus in 1933. I have often told of my memory of meeting Laidlaw on the stairs one morning and hearing his jubilant remark: "The ferrets are sneezing." That was how it all began.

Influenza can be quite readily transmitted to ferrets by dropping a little throat-washing from a patient in the acute stage into the animal's nose. It suffers a perfectly typical attack of influenza with a transient high temperature, goes off its food, looks miserable, sneezes and develops a running nose—with a highly characteristic method of using its tongue as a pocket handkerchief.

The most important thing discovered in the early experiments with ferrets was that influenza was due to a filterable virus; it was not due to the bacterium that used to be, and still is, called the influenza bacillus. Let me at this stage try to make quite clear what is the difference between a bacterium and a virus. Now that the electron microscope has become a highly efficient

instrument it is possible to obtain beautifully detailed pictures of viruses, and their size and appearance can be directly compared with those of bacteria. A typical bacterium, such as the one that causes typhoid fever, weighs three or four thousand times as much as an influenza virus—and there are much smaller viruses which are not much more than one one-thousandth of the weight of an influenza virus.

The second difference is even more important. The typhoid bacillus, like any other bacterium, grows readily on the appropriate sorts of nutrient solution that we use in bacteriology; the virus is quite incapable of growth on anything except the living cells of a susceptible host. This requirement is fundamental in determining how experimental work on viruses must be carried out. At every stage living cells must be used both to grow the virus and to detect its presence. The last portion of that remark requires some qualification; sometimes it is practicable to detect the presence of a virus by other methods. Taking its picture by the electron microscope is the simplest such method to understand, but, for reasons I need not go into, the hardest to do.

Influenza research soon passed beyond the stage of depending on ferrets. First it became possible to pass the disease to mice—a much more convenient laboratory animal than the ferret—and then to the developing chick embryo. It is at this point that my own direct association with influenza virus research began.

In 1935 we isolated a strain of influenza virus in Melbourne, and in the subsequent year we succeeded in making it grow and produce "pocks" on the chorio-allantoic membrane of the embryo. A lot of useful work was done by this method, but it had very definite limitations. One could not make influenza virus straight from the patient's throat grow in this way. It had first to infect ferrets and then to be very gradually adapted to life in what for an influenza virus is a very strange environment.

An important development came in 1940 as a result of work by my late colleague Miss Lush. She found in some experiments on the so-called tissue culture of influenza virus that as one might expect it grew better in a mince of living embryo lung than in tissues from other parts of the chick. So we tried putting virus into chick embryos in such a way that it could easily reach the lung. This method of amniotic inoculation was an immediate success, and I think it is fair to say that the subsequent development of influenza virus research was greatly influenced by it. In the first place, the standard method nowadays for isolating influenza virus is to inoculate throat washing from a patient, mixed with penicillin to kill unwanted bacteria, into this amniotic cavity. Then we found as soon as the method was tried that there were large amounts of virus in both the fluids which act as protective water jackets around the young embryo. All modern vaccines against influenza are now made from such fluids, though nowadays the much simpler method of inoculation into the larger and more superficial allantoic cavity is used. A third important result from this work was the discovery by Hirst in America that the fluids from embryos infected with influenza caused clumping of red blood cells, agglutination as it is technically called. This method has proved of the greatest use for the study of influenza. It means that we can tell how much virus is present in any given fluid without the necessity either to look for it with the tedious methods of the electron microscope or to inoculate it into ferrets or even chick embryos. It can also be modified to tell us whether a serum or a chemical can destroy the virus. Nowadays if we want to find out, for instance, whether an epidemic in some remote part of the country is or is not influenza, all we need is a small set of samples of blood serum from typical patients. One sample is taken when the patient is sick, another fourteen days later when he has recovered. The first serum sample is mixed with a small standard amount of virus. It produces no change in the cell-clumping activity of the virus. But the second sample completely destroys this activity. It may be possible to dilute the serum 100 or 1000 times and still find it stops the virus from clumping red cells. In such a circumstance

UNIVERSITY OF MICHIGAN LIBRARIES

we can say at once that this patient suffered from influenza of the type corresponding to the virus we used in the test. The destruction of the virus by the second serum is due to the development of antibody, the normal protective response of the body to such infections.

This brings us to the most practical aspect of work on influenza, its prevention by vaccination. In general, nobody has two attacks of influenza in one epidemic, and there is plenty of evidence that the protection which follows an attack is due to the antibody generated in response to the infection. Theoretically, at least, if we can produce the antibody without an attack of influenza we will protect the person in question against influenza for as long as the antibody remains present in reasonable amount. This can be done with considerable success by merely taking virus in the form of embryonic fluid, killing it appropriately and injecting the killed virus under the skin. If we can concentrate the virus and get rid of various useless components of the fluid, so much the better, but this is no place to go into the technical details involved. Preliminary tests of the vaccine were highly successful, and in the winters of 1945 and 1946 all American army personnel were immunized. In the 1945-1946 winter there was a moderately severe epidemic of influenza in America, and those responsible for the immunizations were able a few months later to write complacently of how low the army returns for influenza were compared with those of "another service".

But—and this is a very important but—when a somewhat different sort of influenza appeared in America in February, 1927, the same vaccine which had been highly successful in 1943-1944 and 1945-1946 was totally without effect. The reason was soon apparent: a different "type" of influenza had appeared and antibody against the older types was not able to destroy this new type in the test tube or to protect individuals against natural attack. So today's position is that, if we know what type of influenza is going to come, we can protect against it with some confidence, but to do that we shall need to keep a strict watch over the changing character of influenza all over the world.

It is a very interesting point that early in 1946 we had in Australia influenza of the new type or subtype that was responsible for the American epidemic in February, 1947. If we had sent that strain to America and if their authorities had had the vision to have it included in their vaccine I think they would have again had satisfactory results.

The position today, then, is that to protect against influenza we must have available a vaccine of the correct "type". To do this it will be necessary to keep a continuing watch over the changing character of influenza in every continent and to make the necessary changes in the type of vaccine with speed, wisdom and courage.

Yellow Fever Investigations.

It is rather a paradox that the means of controlling yellow fever in most parts of the world were well established before any one knew the nature of the germ that caused it. Perhaps the most famous set of experiments in the history of medicine were those carried out by the United States Army Commission in Cuba in 1900 to demonstrate that yellow fever was spread not by human contact but by a certain mosquito then known as *Stegomyia fasciata*. At that time it was impossible to culture the yellow fever organism or to transmit the disease to animals, so all experiments had to be made with human volunteers. Among the volunteers were American doctors and enlisted men and Cuban civilians. By good fortune only one, Dr. Lazear, died of the experimental infection. Many of you will have read of the general outline of the experiments which were designed to show, first, that men protected from mosquito bite could live safely in surroundings heavily contaminated with vomit and excreta from yellow fever patients and, second, that mosquitoes which fed on yellow fever patients could subsequently transfer infection by bite to volunteers carefully segregated from any other contact with the disease.

The experiments showed clearly what was needed to clear yellow fever from Cuba and the ports of tropical

America generally, and fortunately the habits of the mosquito now called *Aedes aegypti* are such as make it fairly easily controlled. The rule "No *Aedes*, no yellow fever" was found to hold apparently without exception, and in one of the greatest health campaigns in history the West Indies were cleared of the disease and the Panama Canal was built.

In the nineteen-twenties the Americans could say that apart from a few unimportant out of the way places yellow fever had been driven off the surface of the globe. They were wrong. The conquest of yellow fever was not to be as easy as that.

Around 1927 there was a flare-up of yellow fever in West Africa and a joint English-American team of bacteriologists went to Accra to investigate it. It was only in 1928 that yellow fever was proved to be due to a virus by this team supported by the Rockefeller Foundation. Yellow fever had always been a killer and when it was brought into the laboratories it did not change its character. Stokes, the Anglo-Irish member of the team, died of yellow fever. The following year Noguchi, a famous Japanese bacteriologist from the Rockefeller Institute who had worked on yellow fever in South America, came to West Africa to check up the new findings and also died of the disease. For the next few years yellow fever laboratories were dangerous places even in the absence of mosquitoes. In the blood of sick men or sick monkeys there is an enormous amount of virus, and a drop of blood on the skin might be sufficient to infect a laboratory worker. A method of protection was urgently required and about 1933 this became available. By infecting mice with the virus and carrying it from one mouse to the next for 100 generations it was found that the virulence of the virus for monkeys was almost completely lost. If it was inoculated under the skin no symptoms resulted, but the monkeys subsequently became completely resistant to a dose of unmodified yellow fever virus which always killed untreated monkeys. Cautious tests showed that it had virtually the same effect on human beings, and soon a practical vaccine was in being.

By 1936 the methods of inoculating chick embryos with viruses were becoming widely known and were applied to yellow fever. By 1938 the standard vaccine against yellow fever was being produced from chick embryos and, although the technique has since been modified in various ways, it is still the universal method. This use of the chick embryo is the only point at which yellow fever research comes into contact with our own activities.

But I have not yet said why the development of means to get rid of the *Aedes* mosquito did not mean the conquest of yellow fever. Why I interpolated something about how the virus was isolated and made to grow in mice and chick embryos, before returning to the point, is because the detailed study of natural yellow fever could only begin when such methods were available.

The position is now clear: yellow fever exists in the tropical jungles of Africa and South America and until those jungles are cleared it will always remain there. Men who have to work in the jungles can be protected by vaccine. Tropical ports must continue to exterminate *Aedes* mosquitoes or they will be liable to a recrudescence of yellow fever from the jungles. As in so many other fields, the price of freedom from yellow fever in the tropics is eternal vigilance.

The vaccine used against yellow fever is a living virus modified and rendered non-virulent by growth in mice and chick embryos; when inoculated the virus multiplies and produces immunity without symptoms. In this respect it resembles the first vaccine ever developed, the cowpox that Jenner used to vaccinate against smallpox.

Research on Smallpox and Related Viruses.

This brings me to my third virus disease, smallpox. Experimental medicine in the field of infectious disease can fairly be said to start with the various attempts to prevent smallpox by some form of prophylactic inoculation. I do not wish to do more than mention Lady Mary Wortley Montague's introduction of the method of variola-

tion from Constantinople in the early eighteenth century and Jenner's use of cowpox toward the end of the century. One point I would mention. We are so used to talking about vaccines and vaccinations that most people, and certainly most bacteriologists, have forgotten that the word "vaccine" was originally only an adjective used by Jenner to denote virus from the cow as opposed to human smallpox virus. For many years vaccination was a highly controversial topic, and even today there are some who wonder just how much of the virtual disappearance of smallpox from Europe during the nineteenth century was due to vaccination and how much was due to other causes. Whatever these other causes may have been, there is no doubt that recent vaccination is a very potent protection against smallpox and that Jenner's method still remains the sheet-anchor of public health measures against the disease.

What I should like to speak about is some work on the group of so-called pox diseases, including smallpox, which has been carried out in my own laboratory.

The gist of Jenner's work was that a disease of cattle (which Jenner himself thought really came in the first place from horses) should be used to protect against a related human disease. This suggestion that there is a whole series of related viruses each more or less specialized to produce disease in a particular host and with a mild or negligible effect in other potential hosts is probably true. There is cowpox, sheepox, goatpox, rabbitpox and camelpox—two or three years ago we found that there is mousepox also.

Mousepox was described in 1931 under quite a different name and without any recognition of how close it really was to cowpox and smallpox. Our own recognition of that relationship came in a very roundabout fashion. I mentioned in speaking of influenza virus that this virus agglutinated red cells. So also, but with a difference, does cowpox or, as we prefer to call it, vaccinia virus. This same rather special type of agglutination was given by mousepox virus and, what was more interesting, antibody in a serum against vaccinia could also prevent this action of mousepox virus. My colleagues at the Hall Institute have done a great deal of work on the power of these viruses to agglutinate red cells. Miss Stone has shown that the substance which clumps the cells is not the virus itself but a product of its action which contains the fatty substance lecithin as a main component.

Dr. Fenner has made a thoroughgoing study of mousepox, using it as a model in mice of smallpox in men. He has traced the spread of epidemics of the disease through herds of 100 mice and shown how, as in a smallpox epidemic, there are waves of mortality with always some mice surviving which have passed through the disease and become immune. In a herd vaccinated with vaccinia virus, which is as harmless to mice as to men, not a single mouse died of mousepox though a small proportion suffered a mild attack—this again paralleling the experience of a fully vaccinated human population exposed to smallpox.

One of the big problems for the pathologist who attempts to understand smallpox is to know what happens during the incubation period. An unvaccinated person talks for a few minutes to a patient with, at that time, undiagnosed smallpox. Ten days later he becomes ill, and the typical rash appears in another day or two. The same sort of long incubation period is characteristic of measles, German measles, chicken pox and so forth. With the recognition that mousepox was essentially similar to smallpox in most of its characteristics, including the appearance of a rash, the way was open to study just what occurred from the time a tiny dose of virus entered the body until the appearance of the full-blown rash. The general plan was to take a series of mice and inoculate them each with a small uniform dose of virus at a point on the skin. Then at intervals of hours and days two mice at a time were killed and a careful analysis of the amount of virus present in the blood and different organs was carried out: a very tedious business, but out of the results there emerged a picture of what happens in smallpox and similar diseases that could not have been obtained in any other way. The virus first finds a primary lodging

probably in the throat or lung, it multiplies and some of its progeny pass to the nearest lymph gland and leak into the blood. From the blood they are taken up by liver and spleen and perhaps other organs rich in cells of what we call the reticulo-endothelial system. The main multiplication of the virus takes place in these cells, and with their breakdown increasing amounts pass into the blood and reach the skin. Multiplication is going on in the skin for two or three days before the rash appears—the rash being the final manifestation of cells completely broken down by the activities of the virus.

Knowledge of this sort will not help directly to cure smallpox, but it may become very important if and when some new development opens up the possibility of developing drugs active against virus diseases in the same way that penicillin is against streptococcal infections. The fact that we have available so close a model of smallpox in the most convenient of all animals for laboratory study should make the testing of such drugs an easy matter. One can feel quite confident that any drug which checks the development of mousepox in mice will be similarly effective in human smallpox.

Conclusion.

Research in Relation to the Teaching and Practice of Medicine

I have tried to the best of my ability to show something of the process by which three important infectious diseases have through the application of science been brought progressively under control and to indicate how work in one Australian laboratory has played a significant if minor part in this continuing conquest of disease. May I conclude with a few general remarks on the place of research in relation to the teaching and practice of medicine?

Let me first confess that after twenty-five years in the field of medical research I can still be overcome by doubts as to the social justification of such a career. I think most research men at one time or other feel the same. We work hard and conscientiously, we make some small but significant discovery, and we publish a paper about it. That paper probably costs the community a thousand pounds, and sometimes we wonder whether the community has been given its money's worth. A practising physician or surgeon who is doing competent work has a social function that none can question. It is orthodox to pay lip service to research; but I know that many balanced and intelligent men are sceptical in their hearts about the justification of research in medicine, by men who are not geniuses, in laboratories no more than adequately equipped, in places far from the great centres of learning. Stated bluntly, is the research that goes on in Australian medical schools worth what it costs? It is my final task tonight to justify an unequivocal "yes" in answer to that question.

The overall contribution of science and the scientific method to human well-being has been immeasurable, but only in rare instances is it possible to say that this man did this and such-and-such a benefit to mankind resulted. Take even the greatest of all medical discoveries, penicillin. There is vastly more behind the present availability of penicillin in every hospital in the world than Fleming's recognition of the significance of a laboratory accident or Florey's skill in transmuting what had remained a scientific curiosity into the beginnings of a practical therapeutic agent. Behind Fleming was all the knowledge of bacteriological technique that Pasteur, Koch and their followers had developed—and we must not forget that the agar base of the historic plate on which that mould spore of Fleming's landed was there because Frau Hesse, whose husband was one of Koch's men, used agar to make her jellies set better and she had got the recipe from a cousin in Java! And Florey would be the first to admit from what multitudinous sources came the knowledge of how penicillin might be isolated from the crude juice in which the mould had grown or how its curative activity might be measured.

At the present time there is a serious controversy as to the nature and social function of scientific activity.

The communist doctrine is that science is and always has been a by-product of economic necessity and that its social function is wholly to assist in the efficient satisfaction of human needs. The traditional academic view, still ably supported, is that the search for knowledge is an intrinsically valuable activity to be pursued according to certain established rules and finding its greatest success and justification in the emergence of a more and more intellectually satisfying picture of the universe.

Neither of these views can be discarded as extreme or ridiculous, but I think that a satisfactory fusion of the two is possible and necessary. I am sufficiently influenced by the atmosphere of our times to believe that human activities must be viewed against their social background and that support of scientific activity from the community's funds must be justified by a real or potential return of benefit to the community as a whole. I hope my remarks about the background to the discovery of penicillin will indicate how fusion of the two points of view is possible. I believe that the task of science—the whole world activity of scientific and technical investigation—is to provide a general body of accurately established knowledge, from which can be drawn with increasing ease and completeness the information needed to allow the efficient satisfaction of any specific human requirement. No one can say from what queer corner of knowledge important practical needs may gain the information they require. The whole of the accessible universe must be studied and its nature recorded if what may be wanted is to be there. The accumulation of facts must be immense and from a purely utilitarian point of view it is the immensity of the crude data of science that make the work of generalization, the elucidation of the uniformity behind the diversity of the facts, so important. It may be important because the extension of truth is one of those values beyond questioning, but it is equally important at an earlier level because without those generalizations knowledge would be completely inaccessible and unusable. The isolation of penicillin demanded a knowledge of the physical chemistry of how substances will distribute themselves when shaken with two immiscible fluids. Without the generalization expressed as "partition coefficient" to lead Florey and his collaborators, penicillin would never have reached the hospitals.

The real task of the men engaged in research in hospital wards or university laboratories is not to seek a cure for cancer or rheumatism, but to play their part in clearing up the uncertainties and closing the gaps in the medical sciences. This is the sort of activity that we should like to see in all Australian medical schools. The immediate benefit may seem small, but none of the great discoveries of scientific medicine could have come without the guidance provided by hundreds of thousands of such day-to-day investigations.

If I might try to state our objective in one sentence it would be this: The object of medical science, as of science generally, is to build knowledge into an integrated pattern, a pattern which will increase indefinitely in extent, in completeness and in accessibility and yet will always leave more to be discovered.

THE DEATH OF DR. SAMUEL JOHNSON.

By F. W. SIMPSON,
Perth.

ON June 17, 1783, at the age of seventy-four, Dr. Samuel Johnson had a slight cerebral thrombosis. He writes to his friend James Boswell: "About three in the morning, as near as I can guess, I perceived myself almost totally deprived of speech. I had no pain. My organs were so obstructed that I could say 'no', but could scarcely say 'yes'." He was treated by Dr. Heberden and Dr. Brocklesby and made satisfactory progress, being given permission three weeks later "to wash the cantharides from my head".

He made an excellent recovery and resumed his normal activities until September when he was afflicted with gout and a sarcocele. He now consulted Dr. Mudge of Plymouth who advised operation on the scrotal swelling. He wrote to him later: "Excision is doubtless necessary to the cure. The operation is doubtless painful; but is it dangerous? The pain I hope to endure with decency; but I am loth to put my life into much hazard. By representing the gout as an antagonist to the palsy, you have said enough to make it welcome."

Happily the scrotal swelling, which may have been a hydrocele, subsided spontaneously; but worse was to come. He had suffered from asthma for many years and in February of 1784 he became very ill with congestive heart failure. He writes to Boswell: "The asthma, however, is not the worst. A dropsy gains ground upon me; my legs and thighs are very much swollen with water, which I should be content if I could keep there; but I am afraid that it will soon be higher. My nights are very sleepless and very tedious. And yet I am extremely afraid of dying." A fortnight later he wrote to Mrs. Lucy Porter of Lichfield: "I have been extremely ill of an asthma and dropsy but received by the mercy of God, sudden and unexpected relief last Thursday, by the discharge of twenty pints of water." It is amazing how this occurred without "Salyrgan" or "Neptal". He was treated with vinegar of squills and rhubarb. He recovered well and visited Oxford. He then went to London and resumed his club life, conversing with Sir Joshua Reynolds and all the celebrities of the day.

The relief was but temporary and his activities were curbed by his increasing shortness of breath. In November he was again waterlogged and dangerously ill. Four physicians and a surgeon attended him without accepting any fees. Boswell writes: "Imagining that the dropsical collection of water which oppressed him might be drawn off by making incisions in the body, he with his usual resolute defiance of pain, cut deep, when he thought that the surgeon had done it too tenderly." His condition rapidly deteriorated, his breathing became more laboured, his anasarca worse, and on December 13 he died.

It was resolved that a cenotaph should be erected to his memory in Saint Paul's Cathedral and a smaller one was built in the cathedral of his native town of Lichfield. As Boswell writes: "Such was Samuel Johnson, a man whose talents, acquirements and virtues were so extraordinary, that the more his character is considered the more he will be regarded by the present age, and by posterity, with admiration and reverence."

URINARY STRESS INCONTINENCE IN WOMEN.¹

By A. R. H. DUGGAN,
Sydney.

STRESS or exertional incontinence is that form of urinary leakage which occurs on any increase of intraabdominal pressure, as may result from coughing, sneezing or laughing, though, as Macky² says, these unfortunate women have very little to laugh about.

Minor degrees of this condition are accepted as an inevitable sequence of childbirth by many women, and unless specifically asked concerning these symptoms, they do not complain of their condition.

The surgeon should examine the patient himself and actually see the incontinence on exertion. It may not be apparent in the supine position and yet be obvious when standing. Victor Bonney³ advises placing a finger on either side of the urethra and pressing upwards. True stress incontinence will be controlled by this manœuvre. All patients should be referred to a competent cystoscopist, as some conditions of the bladder neck, such as polypi,

¹The subject matter of this paper formed the basis of an address delivered at the annual meeting of the Urological Society of Australasia in April, 1947.

chronic inflammation, tumours *et cetera*, may simulate stress incontinence very closely.

I should like to make a plea for the more frequent collaboration of the urologist and the gynaecologist. In many conditions affecting the genito-urinary system in women, and especially in incontinence, both specialties could collaborate more than they do, to the greater benefit of the patient and of the specialists themselves.

Care must be taken to exclude all cases in which the origin of the incontinence lies in the nervous system. In the literature there are reports of two failures after operation, and subsequently one was found to have *tuberculosis dorsalis*, and the other disseminated sclerosis.

Some patients who have no actual organic nervous disease complain of symptoms closely resembling stress incontinence. Careful questioning will often reveal that the incontinence is not constant, nor is it always exertional in nature. Often there is a history of emotional disturbance, following which the incontinence developed. Such cases should not be subjected to operation.

Anatomical Considerations.

The detailed anatomy of the anterior vaginal wall, the urethra, and the base of the bladder has not been very well established, and a certain confusion exists in terminology and description.

The Internal Vesical Sphincter.

Concerning the internal vesical sphincter, Hinman⁽⁶⁾ states:

This sphincter, unlike the external sphincter, is not a circular constriction of the vesical orifice, but an arrangement of considerable complexity, judging by the disagreement in the descriptions of it.

Millin's⁽⁴⁾ description is probably as accurate as can be obtained; briefly, he describes the internal sphincter as consisting of three components: (a) a detrusor ring, (b) urethral loops with internal and external portions, and (c) urethral bands.

Both Millin⁽⁴⁾ and McCrea⁽⁵⁾ describe striated muscle in the sphincter so that this muscle can, under certain conditions, act voluntarily. That this is so is borne out when there is destruction of the external sphincter by surgery, for example, operation for carcinoma, or by trauma, and incontinence does not result.

Denny-Brown⁽⁷⁾ receives some support in his contention that the internal sphincter extends down as far as the proximal one-third of the urethra.

All of you will have noticed that the passage of even a soft catheter in a normal woman does not meet with the amount of obstruction at the bladder neck which we would expect from a circular muscle, such as occurs at other recognized sphincters, for example, at the anus or pylorus. There is, however, a fold which can be felt at this site, especially if a curved sound is passed. This fold corresponds to the upper margin of the post-urethral ligament, to be described later.

The External Vesical Sphincter.

The external sphincter does seem to be somewhat more definite. Probably the best description is that given by Kelly and Burnham,⁽⁸⁾ who consider that the uppermost bundles surround the urethra, so forming a complete ring; the middle fibres pass over the anterior surface of the urethra and vagina and are inserted into the lateral vaginal walls, whilst the lower fibres surround the urethra and vagina and are inserted into the recto-vaginal septum.

Earlier authors have described this "sphincter of the membranous urethra" as being a thin band of muscle lying between the two layers of the triangular ligament. I have never been able to demonstrate this triangular ligament or its contained muscle to my complete satisfaction, either during operations on the vagina or in dissections of the cadaver. Davies⁽⁹⁾ considers that the external sphincter mechanism consists of three parts: (i) the fibres of the levator muscles which pass under the urethra in its inner section and which, when contracting, pull the urethra up; (ii) the sphincter of the membranous

urethra in the middle; (iii) the fibres of the bulbo-cavernosus muscle near the external meatus which on contraction pull the urethra down.

Kennedy's "Muscle of Micturition".

Here I should like to speak of some very important researches of Kennedy,⁽¹⁰⁾ published late last year. He obtained sections of the urethras of adults and of children cut at right angles to the urethral canal, and others cut at right angles to the sagittal plane of the body, parallel to the canal. These sections were stained by the Van Gieson method. Study of them revealed that many striated voluntary fibres pass from the pubic arch transversely over the urethra, then down into its lateral walls to run posteriorly and obliquely between the longitudinal and circular smooth muscles, and then transversely under the urethra between the smooth muscles of the inner one-third of the urethra. Two small bundles of muscle jut off these inferior transverse muscles, posteriorly and parallel to the canal, to pass into the longitudinal muscles of the trigone, and to end there. (Figure I, II and III.) This muscle, as can be seen from the sections, is quite a size-

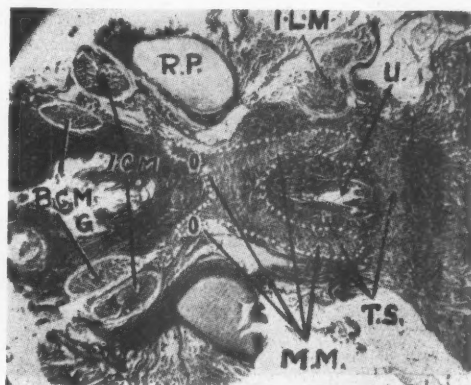


FIGURE I.

Section at right angles to the sagittal plane parallel to the urethral canal through the superior urethral wall. M.M.: muscle of micturition. U.: urethra. O.O.: origin of M.M. T.S.: sphincter. L.M.: levator muscle. R.P.: pubic rami. I.C.M.: ischio-cavernosus muscle. B.C.M.: bulbo-cavernosus muscle. (W. T. Kennedy.⁽¹⁰⁾)

able one, and as far as I know has not been described before. Kennedy considers that its function is to pull the trigone and floor of the proximal urethra forward so that they come under the roof of the inner and middle thirds of the urethra. This also pulls the internal sphincter open and allows micturition to ensue. Consequently he named this muscle the "muscle of micturition".

My urological friends have not observed this particular movement of the urethral floor on cystoscopy, and are still engaged in inventing means to prove or disprove this action.

Whilst affording Kennedy unstinted admiration for the tremendous amount of work he has done, I venture to suggest that, whilst his observations are undoubtedly correct, his conclusions may be wrong. Could not this muscle be a voluntary sphincter? From the description of the fibres, and from the appearance of the sections, I think it much more likely that this muscle is a compressor of the urethra. If it acts as a "muscle of micturition" it must act in antagonism to Young and Wesson's trigonal muscle, which most urologists accept as the muscle opening the internal sphincter. Macky⁽¹¹⁾ lays such stress on the trigonal muscle that in performing his transvesical repair of the internal sphincter he carefully lifts up this muscle and sews the sphincter beneath it. On the other hand Millin⁽⁴⁾ in some cases, resects a portion of the internal sphincter and in doing so cuts

right across and resects the trigonal muscle at the bladder neck. He states that the functional result is perfect, and makes no mention of difficulty in commencing urination.

The Pubo-vesical Muscle Sheet.

One factor regarded by many as important in the maintenance of continence is the pubo-vesical muscle sheet. This is a musculo-fibrous sheet of tissue extending from the pubis to the cervix. Its anterior portion, which Wilfred Shaw⁽¹⁰⁾ describes as the posturethral ligament, is a thick band of tissue formed by the fusion of the vaginal and vesical fascia. On each side this ligament is attached to the pubic ramus as far down as the junction of the rami of the pubis and of the ischium. It supports the urethra, and when it is loose a urethrocele results. The integrity of this ligament is, I am sure, an important factor in the maintenance of continence. Shaw's description of the vaginal fascia and ligaments is excellent, and every practising gynaecologist will clearly recognize the structures he describes.

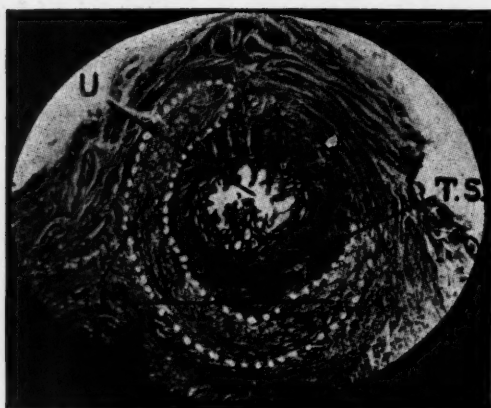


FIGURE II.

Section at right angles to urethral canal in its proximal third (approximately). M.M.: muscle of micturition, most fibres now below urethra. U.: urethra. T.S.: true sphincter. (W. T. Kennedy.⁽¹¹⁾)

The Usual Operations for Stress Incontinence.

The usual operations aiming at the cure of stress incontinence have one or more of the following objectives: (i) repair of the internal sphincter; (ii) repair of the external sphincter; (iii) repair of the supporting structures. I have not included the seldom used procedures such as lengthening and/or twisting of the urethra, Kollman's dilators, or presacral neurectomy, which Van Duzen⁽¹²⁾ uses for obstinate conditions.

Let us consider these three main groups in order.

Repair of the Internal Sphincter.

Kelly,⁽¹³⁾ in 1913, described his operation, the main feature of which was a mattress suture of non-absorbable material placed from the vaginal aspect at the site of the internal sphincter, so that when it was tied the supposedly torn and separated fibres would be approximated. This operation is still employed by many gynaecologists. It should be noted that the pubo-cervical muscle sheet is rendered taut at the same time by the correction of any cystocele present, or, at least, by the deep suturing of the cut edges of the vaginal wall. Johnston⁽¹⁴⁾ considers that Kelly obtained his successes by inadvertently including some of the fibres of the external sphincter in his stitch. Watson⁽¹⁵⁾ maintains that the only thing the Kelly stitch does is to pull the torn pubo-vesical muscle sheet together. It has been estimated that the Kelly procedure allows 15% to 20% of failures.

Both Macky⁽¹⁾ and occasionally Millin⁽⁴⁾ attack the sphincter from inside the bladder and repair it there. Macky⁽¹⁾ states:

The operation should include a general correction of damage to the pelvic floor and outlet, so that a continuing strain shall not be present after operation.

What he actually does *per vaginam* is not stated, nor does he give any figures, either of successes or failures. Could his successes result from an adequate vaginal repair alone?

Millin⁽⁴⁾ only performs his transvesical repair on those patients in whom he estimates, from cystoscopy, cystograms and urethrograms, that the usual vaginal procedures would fail.

In acquired stress incontinence, if the internal sphincter is at fault, logically it should be torn or damaged in its outer fibres by the descending head. It seems to me, therefore, that repair should be from the external aspect, and I see no reason why repair from the vagina should not be just as effective as, if not more so than, through the bladder. In those cases of congenital stress incontinence, with a large gaping internal meatus, transvesical repair

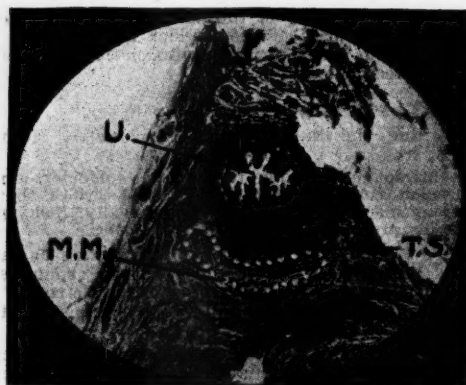


FIGURE III.

Section at right angles to urethra in proximal quarter. M.M.: muscle of micturition, all fibres now below urethra. U.: urethra. T.S.: true sphincter. (W. T. Kennedy.⁽¹¹⁾)

would doubtless be indicated. I understand that this congenital condition is rare. Here I should like to mention a patient of Priestley's reported by Counsellor,⁽¹⁶⁾ in whom the vesical neck and inner third of the urethra were resected for carcinoma, without causing incontinence. Counsellor considers that this is proof that the internal sphincter is of little importance.

Repair of the External Sphincter.

Johnson,⁽¹⁷⁾ Davies,⁽¹⁸⁾ Kennedy,⁽¹⁹⁾ Phaneuf *et alii*⁽¹⁶⁾ consider that tearing of the external sphincter is the main factor in stress incontinence. Johnson⁽¹⁷⁾ searches for and unites the torn end of the muscle, but lists only six cases, in five of which the condition was cured, and ascribes the one failure to separation of the stitches by an infected hematoma. Davies⁽¹⁸⁾ lays stress on the three elements mentioned before, which he considers make up the external sphincter, and repairs each separately. He claims 90 cures in 100 cases. Kennedy's⁽¹⁹⁾ operation will be described in detail later. Phaneuf⁽¹⁶⁾ considers that the sphincter fibres, when torn and inactive, atrophy after a period of a year, and that Kennedy's operation is not sufficient if the incontinence has been present over five years.

It is to be noted that all these operations, as well as repairing the sphincter, also must strengthen the pubo-cervical muscle sheet. Some of the muscle transplanting operations, such as those of Goebell, Stoeckel, Giordano, Squier *et cetera*, are sometimes used for stress incontinence, but need not concern us here. It is very doubtful

whether such muscular transplants retain their muscular function; they probably become replaced by fibrous tissue, and then the transplantation procedure falls into the group of operations the results of which depend for their success on the support of the bladder neck and urethra. Similar results were obtained by Lowsley,⁴⁷ who used ribbon catgut to narrow the lumen and give support to the urethra.

Repair of the Supporting Structures.

Victor Bonney,⁴⁸ in 1923, described how, when an individual coughed, the urethra and bladder wheeled, as it were, around the subpubic angle until the external meatus looked upward and forward, at which point the spurt of urine occurred. He concluded that the incontinence depended in some way on a sudden and abnormal displacement of the urethra at the urethrovesical junction. He considered that the pubo-cervical muscle sheet, and the periurethral wedge of tissue, had sagged; and he endeavoured to repair this supporting mechanism, so that the normal relations were resumed. It is interesting to note that he paid tribute to our own Ralph Worrall, who worked out this mechanism and its repair before 1914. Bonney recognized that even with a full vaginal repair some failures occurred, and he considered that in those cases the supports could not be fully repaired from below. When failure occurred, or was likely, he sutured the bladder to the back of the rectus muscle, to form a further support.

B. P. Watson⁴⁹ holds similar views, and of his operations on 105 patients 12% were failures. In a discussion of Watson's paper Miles Phillips said that there would always be failures, because in some patients the pubo-cervical fascia was "perished", and would not hold sutures.

Aldridge,⁵⁰ and later Studdiford,⁵¹ impressed by the failures occurring after vaginal plastic operations, concluded that the urethral support gave way, either from infection or hemorrhage. They considered that a more durable support was necessary, so they each devised a method whereby strips of anterior rectus sheath were passed beneath the urethra. One advantage of the Studdiford procedure is that the surgeon can set out to do a vaginal plastic operation, and then, if he is not satisfied, go on to the Studdiford method. In his article Studdiford claims 90% of cures. Both he and Aldridge employ their operations only if vaginal plastic operations have proven, or seem likely to prove, inadequate.

The late Reginald Bridge of this city sutured the bladder to the rectus in the same manner as advised by Bonney, and in conjunction with Dr. Telfer, performed several successful operations for stress incontinence, later adding to the operation by providing support for the urethra from above.

Wilfred Shaw sutures the posterior edge of the post-urethral ligament to the lower uterine segment, having separated the bladder from the uterus. He then introduces a series of interrupted Lambert sutures through the posterior urethral ligament to form a shelf for the urethra, and he claims excellent results.

However, inadequate support of the bladder and urethra is not the only factor. Gynecologists constantly see all degrees of bladder and urethral descent with incontinence, and also see incontinence in patients without any apparent relaxation of the supports. It may occur in nulliparous women and in those who have had only Cæsarean deliveries. Again, after repair of a cystocele which has not previously caused incontinence, incontinence may promptly develop.

Here I must mention the important work of Richard Muellner.⁵² He was impressed by the absence of any constant relation between incontinence and cystocele or prolapse, and by the incontinence which may occur without any descent. He therefore endeavoured to find some specific urethral or bladder lesion common to all cases of stress incontinence. Ninety-five patients with stress incontinence were carefully studied, together with 45 women who had no incontinence but had either cystocele or prolapse. Cystoscopic and urethroscopic examinations were made, also cystograms and urethrograms. Muellner could find no specific urethral lesion in incontinence, and

could not confirm the work of Kennedy⁵³ and Barnes,⁵⁴ who from their urethrograms postulated certain urethral changes. He found also a properly functioning internal sphincter in patients with pronounced incontinence. All sorts of urethral configurations were seen without establishing an X-ray picture typical of stress incontinence.

What Muellner did find, however, was that a patient with incontinence, when told to cease urinating, could not do so immediately, and the detrusor muscle continued to contract for a variable time after the initial voluntary effort to stop urination. Patients whose bladders were continent, however, were able to relax the detrusor promptly when requested to interrupt the urinary stream.

Muellner concludes from this that stress incontinence is due to an acquired irritability of the detrusor mechanism that permits minor stimuli, such as are set off by coughing or sneezing, to produce detrusor contractions and corresponding relaxation of the internal sphincter, with consequent urinary leakage. He does not know the cause, but suggests hormonal changes.

In this connexion, it is well recognized that many patients do not develop stress incontinence until the menopause is reached, and in most of these women,

obstetrical trauma, if any, has occurred many years previously. It is well recognized also that many menopausal women with vague urinary symptoms derive great benefit from oestrogen therapy.

Muellner may be right, but as he has no solution of the problem this does not help the unfortunate victim of stress incontinence. If he is correct, then the operations that are performed are successful only when fixation of the bladder neck results, so making it difficult for the sphincter to open to the irregular contractions of the detrusor.

Space will not permit me to describe in detail the careful experiments of Kennedy,⁵³ and later Barnes,⁵⁴ in the investigation of stress incontinence.

Briefly, Kennedy introduced a small rubber bag containing sodium iodide into the urethra and bladder, having filled the bladder with a similar but weaker solution. With variations of the pressure in the bag, X-ray examination showed the contractile power of the sphincter, the contour of the urethra, and the descent of the urethra during micturition. Barnes's work was similar. Kennedy concluded that incontinence was caused by adhesions partially fixing the external sphincter to the posterior lateral margins of the adjacent pubic rami, together with damage to, or rupture of, the external sphincter fibres in the mid-line.

Despite the careful investigations and theories of all these authors, the position remains confused, and much work remains to be done.

The Kennedy Operation.

From the available statistics of the various authors it appears that those surgeons employing the Kennedy⁵³ technique obtain the best figures. Kennedy himself claims 93% of cures, Phaneuf⁵⁵ 91%, and Counsellor⁵⁶ (in 25

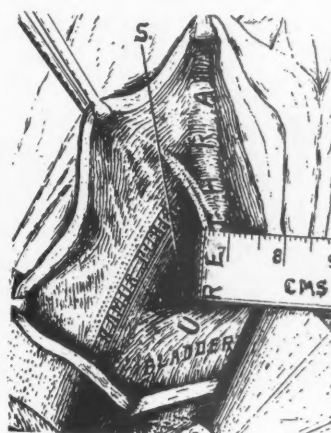


FIGURE IV.

Drawing to show urethra removed from right ramus of the pubis. The separation has been carried back into the paravesical space, a distance of about six centimetres. U-R-B-T-H-R-A: urethra from internal to external meati. S.: line of separation into paravesical space freeing the urethra from the ramus pubis. (W. T. Kennedy.⁵³)

cases) 100%. The main features of the operation are as follows.

An incision is made as for the classical operation for cystocele, and the vaginal flaps are dissected back. By blunt dissection the urethra is separated from the medial posterior margins of the rami, and this separation is carried into the paravesical space (Figure IV). Three mattress sutures of chromicized gut are then placed as in the diagram and tied (Figure V); the proximal suture is just above the internal urethral opening. When traction is made on these sutures there is seen a smooth, very tensile wall of the urethra which has apparently never been damaged. Three more sutures are inserted so that when they are tied this structure is approximated beneath the urethra. The vaginal flaps are then trimmed to eliminate redundancy. Three silver wire sutures are then inserted as in the diagram (Figure VI). Kennedy considers that these sutures approximate the external sphincter fibres. The mid-line is then closed by interrupted chromicized sutures. A male Number 14 catheter is left in for about six days. If necessary, a repair of the posterior vaginal wall and perineum is performed. Complete haemostasis is important; and in a later paper Kennedy advocates drainage of the paravesical spaces by a "Y" drain of rubber tissue.

Kennedy claims that the high dissection into the paravesical space separates adhesions of the urethra to the pubic rami, and considers that much of his success is due to this procedure. I consider that high and wide dissection at the level of the urethra is important, but not for the same reason. Such dissection allows free mobility of the tissues, and the approximation of the tissues beneath the urethra is thus made without tension. The first five or six operations in the series quoted below followed Kennedy's method exactly, except for the use of silver wire, which I consider unnecessary; twenty-day chromicized gut is used instead. I did not like the idea of separating the attachments of the post-urethral ligament to the pubic rami, which is necessary if the "paravesical pouches" are to be opened into. In the remainder of the series the vaginal flaps were therefore separated well out to the attachment of the lateral borders of the post-urethral ligaments to the top of the pubic rami. Occasionally some troublesome hemorrhage was encountered in this area, but as the tissues were approximated it was usually controlled. I do not leave in a catheter, but insist on regular six-hourly catheterization (or earlier if distress is present) until spontaneous and complete emptying of the bladder occurs. I also use a small Foley catheter to demonstrate the internal urethral sphincter where the posterior approximating sutures are inserted.

Discussion.

The work we have done in this subject is in its early stages and far from complete. All patients are examined

with the cystoscope, and cystograms are taken in relaxed, holding, and urinating positions both before and after operation. This part of the work has been done by Dr. A. C. Telfer, and I wish to place on record my thanks for his cooperation and help. We cannot as yet draw any satisfactory conclusions from the cystograms, and more work is necessary, probably under the fluoroscope. One of our main objectives is to distinguish between those patients in whom a modified Kennedy operation will be adequate, and those in whom further support would be desirable. I consider that four months should elapse from the time of operation before the success or otherwise of the operation can be determined. Between March, 1946, and the time of writing this paper 22 patients have been subjected to the Kennedy operation or its modification as described above, and success or failure has been demonstrated. Several of these patients had had one or more previous attempts to cure their stress incontinence. There were two failures in the series of 22 patients. Let us analyse these two failures.

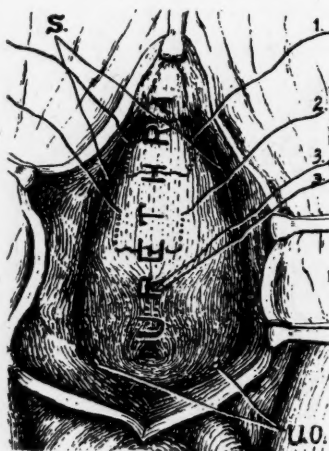


FIGURE V.

Drawing to show the urethra separated from both rami of the pubis. Mattress sutures have been placed to enfold the urethral wall, thus strengthening more or less its damaged structures. 1, 2, 3: mattress number 1 chromicized catgut sutures, 4 is tied. S.: separation—urethra from ramus of pubis (bilateral). U-R-E-T-H-R-A: urethra from internal to external meatus. U.O.: position of urethral orifices. U.: position of internal meatus of urethra. (W. T. Kennedy. (22))



FIGURE VI.

Drawing to show vaginal wall after the damaged portion has been removed. The voluntary sphincter is being drawn together with silver wire. The first wire is passed laterally and anteriorly as far as possible, to grasp the undamaged retracted fibres. Position of voluntary fibres is shown in insert. 4, 5, 6: second row of mattress number 1 chromicized catgut sutures tied. 7, 8, 9: number 26 silver wire sutures. V.S.: voluntary sphincter. W.L.: white line. (W. T. Kennedy. (22))

in six out of seven patients in whom failures occurred after operation.

CASE II.—Miss O., an unmarried nulliparous woman, aged sixty-two years, had had four previous operations for stress incontinence. The vagina was narrow and there was no sign of any relaxation of the anterior vaginal wall. She was operated on early in the series, and in the light of later knowledge I consider she should not have had a Kennedy's operation or its modification at all. Her stress incontinence has improved to some degree, but she is not cured.

Occasionally reeducation in bladder control is necessary after operation. Patients should be warned that complete cure may not occur during the first eight or ten weeks following operation. One patient stated that she was not improved, but careful inquiry and examination showed that there was no stress incontinence, but urgency of micturition. After two months she was quite dry and able to hold her urine for six hours during the day and occasionally got out of bed once at night. I think she can be classed as a successful result.

I do not know the cause of non-neurogenic stress incontinence. The careful and extensive investigations of Kennedy, Barnes, Davies, Muehlner and many others have

CASE I.—Mrs. Y. was seen by me in 1941 with a vesico-vaginal fistula following vaginal repairs in another city. This fistula I repaired. I did not see her again until 1946 when she told me that urinary leakage returned soon after discharge from hospital in 1941, and she had been wet ever since. Naturally both she and I thought the fistula had recurred. However, careful examination and cystoscopy demonstrated that the fistula was quite healed, but severe stress incontinence was present. Kennedy's operation was performed, and the patient's bladder was continent thereafter for three months; then stress incontinence returned. She now has a urethrocele—evidently the supporting structures, for some reason, have given way after the operation. In Studdiford's (23) paper he notes that urethrocele alone recurred

produced conflicting opinions. I have seen patients develop stress incontinence with a cystocele, and when this cystocele becomes larger, or develops into a complete prolapse, the stress incontinence disappears. It is also seen in patients without any apparent relaxation of the anterior vaginal wall. It is probable that there is more than one cause of stress incontinence. I do feel, however, that the degree of angulation between the urethra and bladder neck has something to do with the condition. We are at present endeavouring to obtain more information on this aspect by means of the cystogram and urethrogram.

The operation of Wilfred Shaw⁽¹⁰⁾ is under trial, and the results will be compared with those resulting from the modified Kennedy operation.

Conclusion.

In conclusion, it is my opinion that acquired stress incontinence should be attacked *per vaginam* in the first instance, and that operations of the Kennedy type offer the best chances of success. This operation, in reality, repairs the internal sphincter, the external sphincter and the supporting structures, thus combining in one procedure the three separate objectives of other operations. Great care must be taken to give adequate support to the urethra right to the external meatus, as it seems that, when failure does occur, it is usually the urethrocele which recurs. Failures will occur, and when a second operation is being considered, great care must be taken in deciding what type, or combination, of operations should be employed. The unfortunate victims of this distressing condition, malodorous, miserable, and constantly wet, deserve all the skill and care that we can give them.

References.

- ⁽¹⁾ F. Macky: "Operation for Cure of Stress Incontinence in the Female", *The Journal of Urology*, Volume LII, 1944, page 27.
- ⁽²⁾ V. Bonney: "On Diurnal Incontinence of Urine in Women", *The Journal of Obstetrics and Gynaecology of the British Empire*, Volume XXX, 1923, page 358.
- ⁽³⁾ F. Hinman: "Principles and Practice of Urology", 1937, page 183.
- ⁽⁴⁾ T. Millin: "Some Observations on Surgical Treatment of Urinary Incontinence", *Proceedings of the Royal Society of Medicine*, Volume XXXII, 1939, page 777.
- ⁽⁵⁾ E. D. McCrea: "The Musculature of the Bladder", *Proceedings of the Royal Society of Medicine*, Volume XIX, 1926, page 35.
- ⁽⁶⁾ D. E. Denny-Brown: "Nervous Disturbances of the Vesical Sphincter", *The New England Journal of Medicine*, Volume CCXV, 1936, page 647.
- ⁽⁷⁾ H. A. Kelly and C. F. Burnham: "Diseases of Kidney, Ureter and Bladder", Volume II, 1914, page 366.
- ⁽⁸⁾ J. W. Davies: "Urinary Stress Incontinence: Its Relation to Cystocele and Lacerations of the Pelvic Floor", *The Journal of Urology*, Volume XLVIII, 1942, page 536.
- ⁽⁹⁾ W. T. Kennedy: "The Muscle of Micturition", *American Journal of Obstetrics and Gynecology*, Volume LII, 1946, page 206.
- ⁽¹⁰⁾ W. Shaw: "A Study of the Surgical Anatomy of the Vagina, with Special Reference to Vaginal Operations", *British Medical Journal*, Volume I, 1947, page 4501.
- ⁽¹¹⁾ R. E. Van Duzen: "Stress Incontinence in Women", *The Journal of Urology*, Volume LV, 1946, page 648.
- ⁽¹²⁾ H. A. Kelly and W. M. Dumm: "Urinary Incontinence in Women without Manifest Injury to the Bladder", *Surgery, Gynecology and Obstetrics*, Volume XXVIII, 1914, page 444.
- ⁽¹³⁾ H. W. Johnston: "Urinary Incontinence following Childbirth: Its Surgical Treatment", *Surgery, Gynecology and Obstetrics*, Volume LIII, 1921, page 97.
- ⁽¹⁴⁾ B. P. Watson: "Imperfect Urinary Control following Childbirth and its Surgical Treatment", *British Medical Journal*, Volume II, 1924, page 566.
- ⁽¹⁵⁾ V. S. Counsellor: "Urinary Incontinence in Women", *American Journal of Obstetrics and Gynecology*, Volume XLV, 1943, page 479.
- ⁽¹⁶⁾ L. E. Phaneuf, R. J. Heffernan and G. C. Kasdon: "Functional Urinary Incontinence in Women, A Report of 23 Cases Treated by the Kennedy Operation", *The New England Journal of Medicine*, Volume CCXXIX, 1943, page 743.
- ⁽¹⁷⁾ O. S. Lowsley: "New Operations for the Relief of Incontinence in both Male and Female", *The Journal of Urology*, Volume XXXVI, 1936, page 400.
- ⁽¹⁸⁾ A. H. Aldridge: "Transplantation of Fascia for Relief of Urinary Stress Incontinence", *American Journal of Obstetrics and Gynecology*, Volume XLIV, 1942, page 398.
- ⁽¹⁹⁾ W. E. Studdiford: "Transplantation of Abdominal Fascia for the Relief of Urinary Stress Incontinence", *American Journal of Obstetrics and Gynecology*, Volume XLVII, 1944, page 764.
- ⁽²⁰⁾ S. R. Muellner: "Lack of Specific Urethral Lesion in Exertional Urinary Incontinence", *The New England Journal of Medicine*, Volume CCXXXIV, 1946, page 400.

⁽²¹⁾ W. T. Kennedy: "Incontinence of Urine in the Female", *American Journal of Obstetrics and Gynecology*, Volume XXXIII, 1937, page 19.

⁽²²⁾ A. C. Barnes: "The Roentgenologic Study of Urethral Sphincter Strength in the Female", *The Journal of Urology*, Volume XLVII, 1942, page 694.

⁽²³⁾ W. T. Kennedy: "Incontinence of Urine in the Female, the Urethral Sphincter Mechanism, Damage of Function, and Restoration of Control", *American Journal of Obstetrics and Gynecology*, Volume XXXIV, 1937, page 576.

⁽²⁴⁾ W. E. Studdiford: "The Problem of Stress Incontinence and its Surgical Relief", *Surgery, Gynecology and Obstetrics*, Volume LXXXIII, 1946, page 742.

THE VALUE OF PHYSICAL MEDICINE IN MODERN TREATMENT.¹

By LEIGH T. WEDLICK, M.R.C.P. (London),

Honorary Physiotherapist, Royal Melbourne Hospital, Melbourne.

It seems to me to be particularly opportune that on the occasion of the centenary of this hospital I should be asked to lecture on one of the oldest branches of medicine, which has yet only recently been accepted and used in a scientific manner.

Physical medicine is that branch of medicine which employs physical agents in diagnosis and treatment. Extravagant claims by some of its protagonists, coupled with the conservative attitude of the medical profession (in principle, a wise safeguard), together with the rather indiscriminate, unscientific and commercial use of it in certain quarters, have somewhat retarded its acceptance in medical practice. It is not a cure-all; but used scientifically and honestly, it forms an invaluable and indispensable part of therapeutics which has been left too long in the hands of the unqualified.

In this brief talk I hope to indicate some of the common uses of physical medicine; but I should like at the outset to emphasize that the use of ancillary measures, whether medical or surgical, should never be neglected. Physical medicine should be regarded as an adjuvant in treatment, rather than complete therapy in itself, otherwise the results will often be disappointing.

Probably the greatest bulk of our work is concerned with the rheumatic diseases, and here physical medicine plays a large and essential part, not only in the relief of pain and the restoration of function, but in the prevention of deformities. Unfortunately the rheumatic diseases maim, but rarely kill; hence they receive less attention than they merit, despite their high cost to the community in terms of temporary or permanent disablement.

In fibrositis or muscular rheumatism, pain can usually be rapidly relieved by the use of heat—infra-red rays in superficial lesions, or the more penetrating diathermy or short-wave therapy in deeper lesions. Exercises prevent stiffness, and the judicious use of deep massage is often necessary to clear up the condition in its less acute form. Injections of "Novocain" into localized tender areas can be helpful and often produce dramatic results; but used indiscriminately they will often fail. Generalized ultra-violet irradiation, as a tonic, will often help patients who are "below par". In localized cases in which the condition is resistant to treatment, histamine ionization may be of considerable value. In the treatment of the asthenic, plethoric type of patient, the induction of sweating with hot-air cabinets is a help, particularly combined with hydrotherapy such as the Scotch douche, alternate jets of hot and cold water under pressure being used.

Neuritis, unlike fibrositis, is often aggravated by diathermy and short-wave treatment, and infra-red therapy is preferable; but the most reliable and effective measure is anodal galvanism.

In rheumatoid arthritis, physical therapy plays an essential part. The application of penetrating heat to the affected joints by means of diathermy or short-wave therapy usually gives relief of pain, while graduated massage and

¹ Abridged from a lecture given at the centenary celebrations of the Royal Melbourne Hospital in March, 1948.

movements retain mobility. Paraffin wax baths are helpful for the hands, the moist heat helping to make the fingers supple. Generalized ultra-violet irradiation has a valuable tonic effect on these often debilitated patients. Wasted muscles can be strengthened by exercise and electrical stimulation. Occupational therapy encourages the patient, and may be made not only diversional, but also remedial. The psychological outlook of the crippled is most important, and at all costs they must be kept occupied, with the feeling that they can still play a useful part in the community. The application of suitable plaster splints at night helps correct and prevent deformity, and we should not see gross deformities as often as we do.

In osteoarthritis the results of physical therapy vary a great deal with the site. Osteoarthritis of the knee is a common condition which cries out for physical therapy. No other measure is so effective. Diathermy or short-wave therapy, with massage and exercises, given two or three times a week, rarely fails to give relief in six or eight weeks. The few patients that prove resistant to this régime usually respond to galvanic current. In osteoarthritis of the hip similar measures are adopted; but the results are much more variable. If there is no benefit in two months, it is wise to cease physical therapy and consider other measures. However, in these cases it is particularly important to try to prevent or correct the flexion deformity which so often occurs and upsets the body mechanics. Osteoarthritis is rare at the glenoid cavity, and usually refractory to treatment. It is, however, common at the acromio-clavicular joint, and can usually be relieved. If the hands are involved, simple measures of heat and exercise are usually sufficient. In osteoarthritic spondylitis, most of the pain is usually caused by an associated fibrositis. Infra-red therapy, massage and exercises will often, but not always, give relief. It is important to try to preserve the upright posture.

Gout is much more common than is often thought, and the syndrome of recurrent acute arthritis which completely clears up between attacks is always significant. Similar physical measures are adopted as in the conditions previously discussed, with the addition of eliminative measures, such as the use of electric light cabinets to promote sweating, and colonic lavage.

Ankylosing spondylitis can be only partially helped by physical therapy; but the use of suitable exercises is important, in order to maintain the upright posture and good respiratory excursion.

Cervical and cervico-brachial neuralgia is often due either to osteoarthritis in the cervical part of the spine or to periarthritis, and in such cases stiffness of the neck is present, associated with the neuralgia. In these conditions, apart from the application of heat and the use of massage and exercises, manipulations of the neck under extension as in the Sayre's sling are valuable, and usually effect a considerable improvement. Occasionally this procedure aggravates the condition, and resort must be had to immobilization.

I hesitate to mention the controversial and lengthy subject of sciatica in this lecture. However, I do believe that in many cases the condition is due to a gluteal fibrositis, and further, that these syndromes often respond to conservative treatment. My usual routine is to inject "Novocain", if localized gluteal fibrositis is present, and to follow this with short-wave therapy, deep massage, exercises and sometimes manipulations. This usually effects improvement in four to six weeks, though treatment may need to be further prolonged before a satisfactory final result is obtained. This routine is not followed in acute cases until rest in bed and the application of heat have produced some amelioration of the symptoms. In typical acute cases of the disk syndrome, in recurrent cases, and in cases in which a trial of conservative treatment fails to effect an improvement, the patient is referred to the surgeon.

The "painful shoulder" is a common syndrome which demands physical therapy. The most common variety is the painful, stiff shoulder due to periarthritis, which may be traumatic or rheumatic in origin. It nearly always

responds to treatment, but requires patience, perseverance and judgement. The more I see of these shoulders, the less inclined I am to manipulate them as a general rule. The routine treatment is with short-wave therapy, massage, exercises and gradual stretching, and sometimes minor manipulations. Movements are recorded regularly, and in the course of six or eight weeks there is usually a great improvement, though treatment may be necessary for another month or so. If no improvement has occurred after four or six weeks of conservative treatment, or if improvement suddenly ceases, then manipulation under general anaesthesia is considered. Such manipulation is often followed by a severe reaction, and repeated minor manipulations are often preferable.

The supraspinatus syndrome, due either to trauma or to calcification, is treated with short-wave therapy, with sufficient active movements to prevent stiffness. It usually responds well in about six weeks or so, and I have seen occasional dramatic results follow "Novocain" injections.

Bursitis of the shoulder is similarly treated; but an acute, tense, subacromial bursa is often aggravated by the application of heat, and anodal galvanism is preferable, relief often being obtained in a matter of days. Rest is essential in the acute stage, and an ice bag applied at home for the first twenty-four hours often gives great relief.

In surgical spheres injuries form an important group.

Sprains and strains are treated with the application of heat and infra-red rays, or with the more penetrating diathermy or short-wave therapy. Massage and exercises help restore mobility, and "Novocain" injections may be a help. Manipulation is often necessary when limitation of movement has resulted from adhesions, and this applies particularly to the neck and back regions. I have seen a sacro-iliac strain of three weeks' duration cured with one manipulation.

In the treatment of fractures, early mobilization is important in preventing stiffness, not only in the affected joints, but of distant joints. Despite these measures, immobilization often results inevitably in stiff, swollen joints. The application of deep heat by diathermy or short-wave therapy, with massage and exercises, accelerates recovery, and emphasis should be laid on exercise rather than on massage. The shoulder wheel, the bicycle for knees, the pronator and the supinator apparatus for forearms and wrist, are all useful. The patient will rarely persist with exercise without the physiotherapist's regular supervision. Occupational therapy is valuable during a long stay in hospital and may be made not only diversional, but often remedial as well—for example, planing for the elbows, the shoulder loom for the shoulders, *et cetera*. Resistance exercises increase muscle power more effectively than simple repetitive movements, and are particularly valuable in strengthening the quadriceps group, which waste so rapidly with disuse. The walking frame is helpful in assisting the cripple to walk.

Peripheral nerve lesions are treated with electrical stimulation, reeducation exercises, and corrective splinting—for example, the "cock up" plaster cast for wrist drop, and the toe-raising spring for foot drop. The recent work at Oxford has proved the value of stimulation in these cases in maintaining good nutrition in the muscles, while nerve regeneration goes on. If stimulation is neglected, fibrosis occurs in the muscle, so that even if nerve regeneration becomes complete, permanent incapacity results, because this fibrosis is irreversible.

Adherent scars can be loosened with massage, combined with the softening effects of chlorine ionization. Paraffin wax baths, massage and exercises help restore mobility to fingers which have become stiff as the result of trauma or infection.

Infected wounds and ulcers can be relieved by the use of the powerful bactericidal effects of ultra-violet light; while the administration of heat will often accelerate healing which is otherwise slow.

The course of boils and carbuncles can be shortened by short-wave therapy, and in the treatment of recurrent boils or chronic paronychia, ultra-violet light is of considerable benefit.

In surgical tuberculosis the value of the general and local application of ultra-violet light is well known and widely accepted.

Corrective exercises and postural training are used to correct such defects as scoliosis and the slouching stance. The "head forward" position is a common cause of fibrositis in the neck and shoulders, and can be similarly corrected. It is often seen in association with osteoarthritis of the spine.

Stiff, flat feet are treated with heat, massage, exercises and manipulations, coupled with correct footwear, and in some cases suitable supports or bars. Flabby flat feet are given exercises, with faradic current foot baths to strengthen the intrinsic muscles.

There are certain special branches of medicine in which physical medicine may also be beneficial.

In oto-rhino-laryngology the use of short-wave therapy has proved of considerable value in the treatment of sinusitis, particularly in acute cases, or in exacerbations of chronic trouble. In hay fever zinc ionization or the local application of ultra-violet light is well worth a trial, and does not involve the patient in lengthy treatment or much expense. The treatment has its failures, but no more than other forms of therapy in this condition.

In the sphere of gynaecology, intra-pelvic diathermy by means of a vaginal electrode is of proved value in the treatment of pelvic infections. Short-wave therapy is not so efficient as a rule, but is useful as a preliminary measure in acute cases. In cervical erosions, diathermic fulguration and the use of zinc or copper ionization are a help.

Colonic lavage is of value in cases of intestinal foci operating in rheumatism, and also in chronic constipation and diverticulosis. It can be given efficiently by means of the Studa chair.

In bronchitis and asthma, breathing exercises have become almost a routine part of treatment. In bronchiectasis these exercises are used before and after operation.

Peripheral vascular deficiency associated with the intermittent claudication syndrome is still a problem; but it has been found that considerable improvement can be obtained in at least 50% of cases by the use of Buerger's exercises and "Pavaex" treatment. In "Pavaex" treatment the limb is enclosed in a glass boot and subjected to automatic alternations of suction and pressure at predetermined levels.

In dermatology, ultra-violet light is often of value, particularly in psoriasis, pustular dermatitis and acne. It is the standard treatment in tuberculosis of the skin, though its use in this condition appears likely to be supplanted by the use of massive doses of vitamin D.

Lastly, I should like to mention artificial fever therapy, of value in the treatment of syphilis of the nervous system, of certain nerve diseases and of some cases of gonorrhoea. The Kettering type of fever cabinet permits the temperature of the patient to be maintained at any level for any desired length of time, with accurate control. In high fever, in which the temperature is kept above 105° F. for from five to ten hours at each treatment, there is, of course, some risk; but this may be kept small by the use of institutional facilities and by a well-trained staff.

Conclusion.

In conclusion, I hope that I have given you some idea of the wide scope and value of physical medicine; but I feel that I cannot close without a word of warning.

Physical medicine is not to be regarded as an easy specialty. I do not know of any specialty in which it is more important to possess a wide knowledge of general medicine and a broad perspective. I feel there is much to be said for Osler's dictum that every specialist should first experience ten years of general practice.

An accurate diagnosis is the first step in treatment.

The next step is the realization that physical medicine is often only a part of the therapeutic attack, and other measures must not be neglected.

Lastly, I would put forward a special plea—one which I am always trying to instil into my students. This plea is for honesty—honesty with oneself in assessing results,

honesty with one's fellow practitioners, and honesty with the patient.

On the shoulders of the practitioner in physical medicine rests the responsibility to see that this branch of medicine receives the recognition it deserves. If we are honest, this will be so.

I am glad to see that already one State in this country has incorporated in the medical curriculum a basic training of medical students in the principles of physical medicine. In other States the question is being considered now; and I earnestly hope that it will not be long before every medical graduate will have at least some knowledge, if not of the technical details, then surely of the indications and uses of a valuable therapeutic weapon. No longer should we see the young doctor—and that means his patients also—handicapped by complete ignorance of an essential part of medical treatment.

Reports of Cases.

CONGENITAL ABSENCE OF ONE KIDNEY.

By K. M. BOWDEN,
Melbourne.

LOWSLEY and KIRWIN in their discussion on the subject of congenital absence of one kidney in their text-book of clinical urology state: "There is entire absence of nephrogenic tissue on the one side, and hence absence of the kidney, ureter and corresponding half of the trigone. The suprarenal gland on the agenic side is likewise absent, which it not the case in hypoplastic kidney or renal aplasia."⁽¹⁾ This statement is challengeable on several grounds.

The kidney embryologically has a double origin. From the Wolffian duct an outgrowth occurs which eventually gives rise to the ureter, renal pelvis, calyces and straight collecting tubules. As the ureteric bud is developing the metanephros appears and covers the growing end of this bud; it eventually gives rise to the remainder of the kidney. At first the two elements are separate, but fusion soon occurs and the kidney, which arises at the second sacral level, ascends to the lumbar region.

The suprarenal gland likewise has a double origin, but one that is quite independent of the developing kidney. The medulla is intimately related to the sympathetic nervous system. The cortex is of mesodermal origin and appears as a ridge close to the Wolffian body. The suprarenal glands are situated at first to the medial side of the Wolffian bodies at their upper ends. "Their final relation to the metanephros is a secondary event, and is merely a topographic relation, there being no developmental connection between the two structures."⁽²⁾ On embryological grounds therefore there is no reason why the corresponding suprarenal gland should be absent when there is congenital absence of one kidney.

In view of the complicated development of the kidney it is not surprising that congenital abnormalities are not rare. Absence of both kidneys is a rare happening and usually this is associated with monstrosity.

Congenital absence of one kidney is, however, not a great rarity and should always be excluded before any renal operation is performed. Thomson Walker collected reports in the literature of eighteen cases of congenital absence of one kidney in which the only kidney was surgically removed, with resultant death from uræmia in a few days.

It is not easy to state what the true incidence of this condition is. The statements in the literature vary widely from 1 in 1000 to 1 in 2500 individuals. This wide variation in the figures may be due to the fact that solitary kidney has been reported as such when there has been a condition of aplasia or pronounced hypoplasia on the affected side. The two cases which are reported in this article occurred in 1987 autopsies. Dr. Jago, of

Melbourne, says that in his experience in routine autopsies in the asylums he has found the condition once in every one thousand cases.

Congenital absence of one kidney should be differentiated from aplasia and hypoplasia, as well as from acquired atrophy and from unilateral fused kidney in which both kidneys are present on the same side and fused so that there is a double pelvis. In this latter condition there are usually two ureters with two separate openings into the bladder.

Congenital absence of one kidney is usually due to complete arrest of development of the ureteric bud from the Wolffian duct, although cases have been reported in which a very primitive ureter has been present on the affected side.⁽¹⁾ In true congenital absence of the kidney there is usually no trace of a ureter, and the portion of the trigone on that side is undeveloped because the musculature of that half of the trigone is formed largely from the muscle of the corresponding ureter. In aplasia a ureter is present and the corresponding half of the trigone is there, but the kidney is represented by a functionless mass. A hypoplastic kidney may be a miniature functioning kidney or one represented by only cortical structures with a hydronephrotic pelvis. This condition is important after surgical nephrectomy⁽²⁾ because such a kidney does not undergo compensatory hypertrophy. The statement of Gutierrez⁽³⁾ that "absence of the nephrogenic tissue of the Wolffian duct also results in failure of the suprarenal gland to form on the agenetic side—an important point in differentiating renal agenesis from renal aplasia or hypoplastic kidney" is not a sound one.

The solitary kidney may be found in its usual position or in an ectopic position and is distinguished by the fact that it has a single ureter opening into the bladder in which the opposite half of the trigone is undeveloped. Solitary kidney is compatible with long life, as is illustrated in the first case, and as it is usually a symptomless condition, the majority of cases are discovered *post mortem*. Solitary kidney is, however, said to be peculiarly susceptible to disease. Apart from compensatory hypertrophy of the solitary kidney (the usual finding), in one series of cases, quoted by Young and Davis,⁽⁴⁾ out of 170 cases 79 showed pathological changes such as parenchymatous nephritis, pyelonephritis, and calculous disease.

Anomalies of the genital organs in both males and females are of frequent occurrence in association with

congenital solitary kidney. Anomaly of the genitalia was found in 20 of 41 cases of pelvic single ectopic kidney.⁽⁵⁾

The following cases, the first two of congenital solitary kidney, the third of acquired atrophy, illustrate some of the foregoing remarks.

Case I.

P.K., a thin old man, aged ninety-two years, died from bronchopneumonia. Autopsy showed diffuse bronchopneumonia and cirrhosis of the liver. Both suprarenal glands were present and normal in appearance. The left kidney was absent. There was no left ureter. There was no ureteric opening or dimple on the corresponding side of the bladder where the trigone was undeveloped. The right kidney was present in its usual situation and as far as could be judged it was a little smaller than usual.

The surface was very granular; the capsule was adherent firmly to the underlying cortex. There was a moderate degree of internal hydronephrosis due to obstruction from a moderately enlarged adenomatous prostate. Situated on the outer aspect of the kidney towards the lower pole was a typical carcinoma of the kidney. It was irregularly oval, between two and three inches in diameter and projecting well above the surface of the cortex. On section it had the usual variegated appearance with areas of hæmorrhage, and microscopically presented the features of a papillary cyst-adenocarcinoma.

Case II.

R.T., a male, aged sixty years, died from methylated spirits poisoning. The genital organs were normal. The left kidney was absent; there was no ureter on that side, no ureteric opening on that side of the

bladder, and again the trigone was absent on that side. Both suprarenal glands were present in their normal situations and there were bilateral suprarenal tumours present. Each tumour was an ovoid whitish-yellow mass of firm consistency arising from the cortex in each case and replacing most of the gland. Each tumour was encapsulated, and was approximately one inch by three-quarters of an inch in size. A photomicrograph of the suprarenal adenoma on the anephrogenic side is shown in the accompanying figure (Figure 1). Microscopically it consists of sheets and masses of cells separated by a little vascular stroma. The cells are large and well defined with a foamy cytoplasm and possess a well-defined vesicular nucleus.

Case III.

E.H., a male, aged seventy-six years, was struck on the right side of the body by a cyclist. He was admitted to

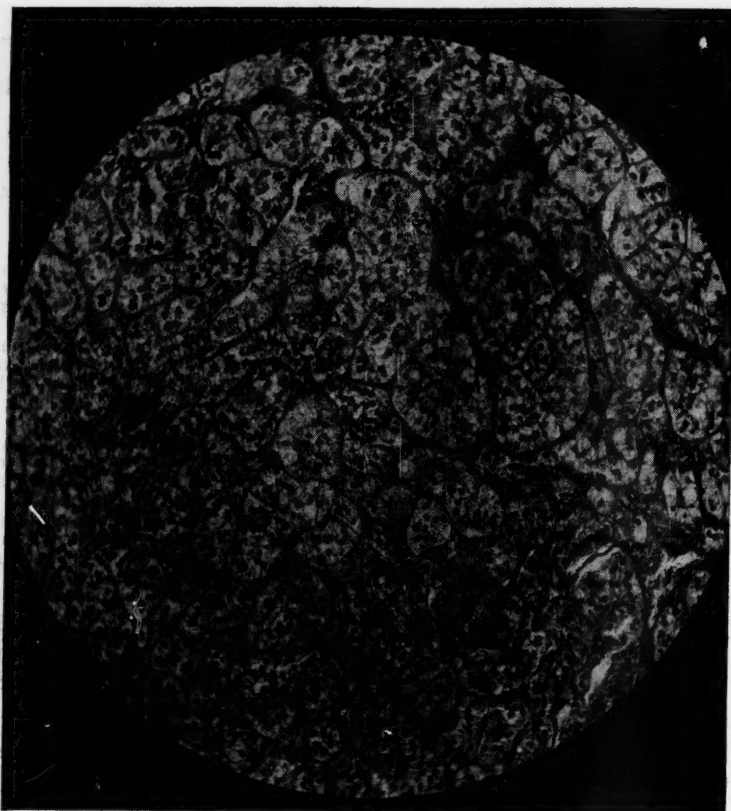


FIGURE 1.

High-power photomicrograph of suprarenal tumour on the anephrogenic side.

co-
ab-
ge-
pr-
ad-
ki-
ca-
thi-
de-
sid-
em-

Ed-
Six-
II,
loc-
The

Neu-
resu-
psy-
been
the
jour-
mere
orde-
Dr
who
aply-
pres-
and
anec-
the
in p-
Th
the a-
of co-
reve-
there
in an
indul-
dosag-
emph-
envis-
usele-

1 "A
M.D.,
Churo

hospital with typical signs and symptoms of a ruptured right kidney and was treated conservatively. He died two days later. Autopsy showed a small subcapsular hemorrhage on the inferior surface of the right lobe of the liver. The right kidney had two transverse tears extending across its anterior surface opposite the pelvis and involving the underlying substance for a depth of about half an inch. There was an extravasation of blood into the surrounding perinephric space. The left kidney was almost completely atrophied. The surface was very granular; the cortex was greatly reduced in amount and was represented by a thin rim of tissue around the reduced medulla. The arteries of the kidney were greatly thickened. The ureters and bladder were normal. The suprarenals were normal. There was a small diverticulum of the bladder in the retro-trigonal area in the mid-line, and the prostate was enlarged and adenomatous, especially the middle lobe.

Summary.

Attention is drawn to the incorrect statement that the corresponding suprarenal is always absent in congenital absence of a kidney. Two cases are described of congenital absence of a kidney in which both suprarenals were present. In one case there were bilateral suprarenal adenomata present. In the other case of congenital solitary kidney in a man, aged ninety-two years, there was a typical carcinoma, hydronephrosis and degenerative changes. The third case was one of unilateral acquired atrophy in which death resulted from rupture of the kidney on the opposite side. The surgical significance of these conditions needs no emphasis.

References.

- (1) O. S. Lowsley and T. J. Kirwin: "Clinical Urology", Second Edition, 1944, Volume II, page 1362.
- (2) J. P. McMurrich: "The Development of the Human Body", Sixth Edition, 1920, page 374.
- (3) Young and Davis: "Practice of Urology", 1926, Volume II, page 10.
- (4) Gutierrez: Quoted by O. S. Lowsley and T. J. Kirwin, *loc. cit.*, page 1364.
- (5) Young and Davis: *Loco citato*, page 11.
- (6) H. B. Mays: "Pelvic Single Kidney: Report of a Case", *The Journal of Urology*, Volume LVI, 1946, page 619.

Reviews.

MODERN PSYCHIATRY IN PRACTICE.

"MODERN PSYCHIATRY IN PRACTICE", by Dr. W. Lindesay Neustatter, has been published in a second edition.¹ As a result of further experience, a chapter has been added on psychopathy and neuropsychiatry. Several chapters have been revised and enlarged. The author has not corrected the deficiencies discussed in the previous review in this journal. Melancholics still wilt from lack of sedation, stammerers are not taught to sing, anorexia and pituitary disorders are not differentiated.

Dr. Neustatter reveals himself as an incurable individualist who writes his own experiences. The book could have been aptly entitled "Neustatter in Practice". This type of presentation has a definite appeal for the medical student and practitioner. The perspectives are clear cut, the anecdotes are personal. The author takes the reader into the consulting room and speaks the actual language used in patient-doctor relationships.

The main approach is through psychoanalysis, of which the author is a broad-minded exponent who without twinges of conscience uses blatant suggestion upon occasion. He reveals his dominant trend in two slips—in one paragraph there is a reference to Freud as though he was still alive, in another he belittles the role of convulsive therapy and indulges in wishful thinking. He states that the customary dosage is 10 volts for 0.2 second. The actual amount employed is (*circa*) 140 volts. The Lilliputian dosage envisaged by the author would be entirely innocuous and useless.

¹ "Modern Psychiatry in Practice", by W. Lindesay Neustatter, M.D., B.Sc., M.R.C.P.; Second Edition; 1948. London: J. and A. Churchill, Limited. 8" x 5½", pp. 284. Price: 12s. 6d.

By a paradox the Neustatter bias has definite advantages. The general practitioner's demand for a practical manual on disorders of the bladder would not be satisfied by a treatise on the use of a cystoscope. The intricacies of this instrument are a matter for the specialist. In dealing with disorders of the nervous system convulsive therapy is in the same category. Its extensive use by the psychiatrist could give the student an impression that it is universal in its application. This is, of course, not the case. Convulsive therapy should be employed only by the expert, and usually only when more simple measures have failed. The author's approach simplifies the problem for the tiro through its deliberate under-assessment of convulsive treatment.

Returning to the paradox, whilst the average psychiatrist must deprecate the manner in which depressed patients are exposed by Dr. Neustatter to time-consuming psychoanalysis, he can appreciate that the procedure has tangible value for the student.

The book has an excellent section dealing with behaviour problems of children. It is written on common-sense lines and deals adequately with the parent-child relationship. In the foreword the author claims personal insight through his own wartime experience in sharing a bed-sitting room with a wife, infant daughter and Labrador retriever. Few will deny the author's claim that there could be no task in the upbringing of a small child in which he has not had practical experience.

Two chapters deal with sexual difficulties and abnormalities. Sections are devoted to psychopathology, neuroses and psychoses in adults, methods of treatment and general matters including psychology and general medicine, causations and prophylaxis, the law and the problems of disposal.

Enough has been stated to indicate that "Modern Psychiatry in Practice", in spite of errors and omissions, is still worth a place in the library of the medical student and general practitioner.

HEARING AIDS AND AUDIOMETERS.

COPIES of the Medical Research Council report on Hearing Aids and Audiometers¹ have now appeared after some delay apparently due to printing difficulties. Some considerable development has, therefore, occurred since the original study was made.

The report is divided into a brief general account of hearing aids and audiometers and a considerable number of technical appendices. The primary objective was "the development and ultimate specification of a standard hearing aid easily manufactured and of greatest assistance to the majority of deaf persons".

It is important to note that in this connexion the objective was to see if a high-quality hearing aid of standard performance would be suitable for the majority of persons, rather than to attempt to standardize an aid irrespective of whether it suited the majority of persons. Possible aid characteristics were reviewed and the criterion was adapted for design of an aid whose output was controlled by the ear tolerance. Subjective testing methods are described, the loudness level being taken as chosen by the individual deaf person himself.

The response of the hearing aid giving the best overall results is shown with a recommendation for tone control to alter the response at 750 cycles from "flat" to rising approximately five decibels per octave. It is interesting to note that the rising characteristic is to be used for people with an even loss, the flat response for those having increased high-tone loss. The factor controlling this is that where increased high-tone loss makes inefficient use of these frequencies, then increased attention should be paid to frequencies in which the loss is less. A sharp cut-off below 750 cycles is recommended. This does not agree with local determinations and with overseas results. The recommended presetting of the tone control at the clinic would not enable the wearer to make adjustment where desired for changing conditions such as noise.

The components for making such hearing aids are mentioned with emphasis on microphones, valves and earphones of American origin. Since the time of the issuing of the report large orders placed for the national health scheme have enabled many of the vital components to be

¹ "Hearing Aids and Audiometers: Report of the Committee on Electro-Acoustics"; 1937. Medical Research Council of the Privy Council, Special Report Series Number 261. London: His Majesty's Stationery Office. 9½" x 6", pp. 76, with illustrations. Price: 1s. 3d.

made in England. Clinical tests showing good results of an aid built to the recommended specification are described.

Audiometers are mentioned in Part 2 as providing the most convenient means of making quantitative tests for hearing tones. However, lack of uniformity always found by independent laboratory tests is again mentioned, differences of up to 20 decibels in output at the same frequency occurring between audiometers of different manufacture. These differences, unknown to medical users, have often confused diagnosis. Calibration of air and bone conduction frequency limits is described, and frequency limits up to 8000 cycles are considered desirable.

In Appendix 2 a theoretical derivation of the optimum frequency response characteristic of a hearing aid is made. Unfortunately this is mainly a mathematical derivation, the basic physics of which is not made clear; the physical assumption on which the derivation is based is valid only in a narrow sense. Alternative criteria for optimum frequency response are only briefly mentioned. The effect of room noise is shown. It is very helpful, however, that the study has brought out that there are arguments in favour of reducing the gain at the higher frequency if the loss there is greater, and not, as often assumed, that increased gain should be placed where there is increased loss on the audiogram.

Artificial ears for measuring the acoustic output of the hearing aid and audiometer earphone, which are somewhat different from those used locally and in America, are described in Appendix 3; in Appendix 4 an objective method of measuring hearing aids is described. The response desired to be measured in this way is as shown in the main body of the report. Unfortunately this objective measurement requires the inclusion of a graph which includes diffraction of sound waves around the human head to a progressive sound wave in a free field. This effect is only one of many differences between listening to speech directly and via a hearing aid, and it appears better that correction of such subjective effects should be left out of the laboratory response curves.

Crystal insert receivers which in Appendix 6 have been recommended for hearing aids may cause maintenance difficulties in wide temperature and humidity variations encountered throughout Australia.

Appendix 7 outlines Harvard word lists used in the intelligibility tests, and it is pleasing to notice that these lists, most generally used in America and Australia, have been the material used for these tests instead of the various materials generally used in English tests in the past. Thus international comparisons can be made.

Recommended standards for audiometers are discussed in Appendix 8, and in Appendix 9 a detailed study of commercial audiometers is made.

This report is a valuable contribution to this field and should be of great assistance in helping better hearing aids and audiometers to be produced, both by manufacturers' taking account of information contained, and by the building up of an enlightened body of criticism against inferior articles.

ANATOMY AND PHYSIOLOGY AND CAUSES OF DISEASE

"ANATOMY AND PHYSIOLOGY, AND CAUSES OF DISEASE" by John P. Mitchell, the second edition of which now appears, is one of the publisher's "Elementary Tropical Handbooks". As stated in the foreword, books in this series "are simply written so that they can be used by those whose knowledge of English is too limited to enable them to use standard English textbooks". As the original title of this series was "Medical Manuals for Africans", it is assumed that the book was written primarily for the use of African native nurses and orderlies; but even admitting the simple language of the text, the education standard of the readers must be high for them to appreciate the technicalities of the subjects discussed. For this reason even had the book been written in "pidgin", it would still be far too advanced for the use of Australian aborigines or for the natives of New Guinea. Therefore, whilst the worth of this little book for African readers is undoubtedly high, it has little practical use in this country, except perhaps for administrators whose job it is to lecture to native orderlies in New Guinea.

¹ "Anatomy and Physiology, and Causes of Disease: For the Use of Students in Tropical and Subtropical Countries", by John P. Mitchell, C.B.E., M.D.; Second Edition; 1948. London: Baillière, Tindall and Cox. 6½" x 4", pp. 240, with many illustrations. Price: 5s.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Clinical Diagnostic Methods or the Examination of Patients", by C. G. Lambie, M.C., M.D., F.R.C.P. (Edinburgh), F.R.S.E., F.R.A.C.P., and Jean E. Armytage, M.B., B.S. (Sydney), M.R.A.C.P.; 1947. Sydney: Grahame Book Company. 9½" x 6½" with many illustrations, some of them coloured. Volume I (General), pp. 560. Volume II (Special), pp. 604.

A detailed description for senior medical students and resident medical officers of the methods of eliciting and recording symptoms and signs.

"Practical Methods in Biochemistry", by Frederick C. Koch and Martin E. Hanke; Fifth Edition; 1948. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" x 5", pp. 430. Price: 22s. 6d.

A manual for medical students on the more important qualitative and quantitative aspects of biochemistry.

"Epilepsy: Proceedings of the Association Held Jointly with the International League Against Epilepsy, December 13 and 14, 1946, New York"; Editorial Board: William G. Lennox, M.D., H. Houston Merritt, M.D., and Thomas E. Bamford, M.D.; Volume XXVI; 1947. Research Publications: Association for Research in Nervous and Mental Disease. Baltimore: The Williams and Wilkins Company. 9" x 5½", pp. 676, with illustrations. Price: 90s.

The papers and discussion put forward at a conference on epilepsy.

"Treatment by Manipulation in General and Consulting Practice", by A. G. Timbrell Fisher, M.C., M.B., Ch.B., F.R.C.S. (England); Fifth Edition; 1948. London: H. K. Lewis and Company, Limited. 8½" x 5", pp. 290, with illustrations. Price: 25s.

The pathology, diagnosis and treatment of conditions amenable to manipulative treatment with an historical introduction and a chapter on the cult of osteopathy.

"A Textbook of Anaesthetics", by R. J. Minnitt, M.D. (Liverpool), D.A. (R.C.P. and S. Eng.), and John Gillies, M.C., M.B., Ch.B. (Edin.), F.R.C.S. (Edin.), D.A. (Eng.); Seventh Edition; 1948. Edinburgh: E. and S. Livingstone, Limited. 8½" x 5", pp. 568, with illustrations. Price: 30s.

A new edition of a text-book on anaesthetics with additional chapters on curare and some legal aspects.

"Oral and Dental Diseases: Aetiology, Histopathology, Clinical Features and Treatment", by Hubert H. Stones, M.D., M.D.S., F.D.S.R.C.S. (England); 1948. Edinburgh: E. and S. Livingstone, Limited. 9½" x 6½", pp. 918, with illustrations, some coloured. Price: 90s.

A text-book for dental students and a reference book for dental and medical practitioners.

"Emergency Surgery", by Hamilton Bailey, F.R.C.S. (England), F.A.C.S., F.I.C.S., F.R.S.E.; Part II; Sixth Edition; 1948. Bristol: John Wright and Sons, Limited. London: Simpkin Marshall (1948), Limited. 10" x 6", pp. 188, with many illustrations, some of them coloured. Price: 21s.

The second part of a new edition which is being issued in five parts. It deals with abdominal surgery.

"Minor Surgery", by R. S. McNeill Love, M.S. (Lond.), F.R.C.S. (Eng.); Third Edition; 1948. London: H. K. Lewis and Company, Limited. 7" x 4", pp. 440, with illustrations. Price: 22s. 6d.

A guide to resident medical officers and practitioners dealing with minor surgical problems or common surgical emergencies.

"Clinical Neuro-Ophthalmology", by Frank B. Walsh, M.D., F.R.C.S. (Edin.); 1947. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson. 10" x 6", pp. 1552, with many illustrations. Price: £6 15s.

A detailed study of neuro-ophthalmological diagnosis with the emphasis on clinical aspects.

"Glomerular Nephritis: Diagnosis and Treatment", by Thomas Addis, M.D., F.R.C.P. (Edin.); 1948. New York: The Macmillan Company. 9" x 6", pp. 362, with illustrations. Price: \$8.00.

Written because the author considers that the present-day treatment of patients with renal disease is inadequate and sometimes dangerous.

"Clinical Electrocardiography", by David Scherf, M.D., F.A.C.P., and Linn J. Boyd, M.D., F.A.C.P.; Third Edition; 1948. London: William Heinemann (Medical Books), Limited. 8½" x 5½", pp. 451, with illustrations. Price: 30s.

A book on clinical electrocardiography "not designed primarily for those beginning their study in this field".

The Medical Journal of Australia

SATURDAY, SEPTEMBER 11, 1948.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

HEADACHE.

It is interesting to reflect on the fact that trepanning of the skull appears to be the earliest known form of major surgery and on the further fact that multitudes of modern shops from pharmacies to sweet shops maintain a steady and even brisk trade in powders or tablets of aspirin, phenacetin and caffeine or similar preparations. Man, who dominates the brute creation by the exercise of superior brain power, is at the mercy of headache. If one may judge from the practice of certain primitive tribes today, trepanning was carried out to repair the dents made by unfriendly clubs. Some of modern man's worst headaches come from a variety of more subtle hostile influences; the approach is less direct, but the principle is not dissimilar. Clinically, of course, the problem is most unsatisfactory. There is a group of organic causes of headache which careful investigation will disclose and for some of these effective treatment is practicable. Others have yet to be understood and mastered. The general public has to an appreciable extent taken the matter into its own hands and suppresses with analgesic preparations all forms of pain in the head, whether it is due to serious organic disease, mental confusion or a minor disturbance of any one extracranial or intracranial structure. The medical profession is perhaps not free from blame that this practice has grown up, but it must be admitted that the assessment and management of the symptom constitute in themselves, metaphorically at least, a headache of considerable proportions. Discussions of the subject in standard medical works are not always very helpful and the subject receives surprisingly little attention at clinical meetings. W. A. Alexander, in the opening paper of a symposium on headache as a symptom¹ read at a meeting of the Medico-Chirurgical Society of Edinburgh, suggests that the ordinary doctor is a little overawed by the magnitude of the problem and also has an uneasy feeling that the years have not advanced his knowledge of the problem or his capacity to deal with it in practice. This is not

entirely true for much work has been done on the subject, some of it of doubtful value, some of it constructive and useful. Alexander's own discussion of headache covers quite a lot of ground. Dealing first with the pain-sensitivity of the head structures, he states that apparently the calvaria (without its periosteum), the brain, and most of the dura and pia-arachnoid are insensitive; the investing tissues on the outside of the skull, the basal dura with its tentorial shelf, and the blood vessels are sensitive. The cranial arteries, particularly in the territory of the fifth nerve, which include the extracranial arteries, the dural arteries, and the cerebral arteries, in addition to the great venous sinuses and their tributaries from the surface of the brain, seem to be highly sensitive to distension, traction and pressure. Of the cranial nerves the fifth is much the most important, but below the level of the tentorium pain impulses are also conducted by the ninth and tenth, as well as by the upper three cervical nerves. These nerves may be involved in general or local disorders with corresponding effects. On the question of the mechanism of headaches, Alexander states that the degree of headache associated with increased intracranial pressure bears no relationship to the height of the pressure and that extreme pressures may be artificially induced without the production of headache. On the other hand headache frequently follows a drop in intracranial pressure, for example after lumbar puncture. Alexander emphasizes that a vascular basis for most headaches is now widely accepted, even those associated with tumour being attributed to tension of and traction on pain-sensitive vascular structures. The headache of meningitis may, however, be due to direct chemical irritation of the pain receptors. Histamine is thought by many to produce headache by stretching the cerebral arteries as part of its vasodilation action; so-called "toxic" and pyrexial headaches may be similar in nature.

J. K. Slater, who discussed migraine in the symposium, states that complete proof exists that the painful phase of migraine

commences when there is a localised vaso-dilatation of the cerebral capillaries and arterioles, most often branches of the external carotid artery on one side, later spreading and being associated with a variable amount of cerebral oedema, all this being visible externally as flushing, pulsation, and being tender to touch.

Slater seems much attracted to the importance of allergy in producing this response. He suggests that the subject of migraine inherits some basic idiosyncrasy or constitutional tendency which acts as a precipitating factor when a suitable emotional stress or tension exists, and that perhaps the necessary tension so upsets the vasomotor control of the gastro-intestinal tract as to allow the offending molecule to be more readily absorbed when in fact it happens to exist.

Opinions differ on the importance of ocular factors in causing headache. H. M. Traquair, who dealt with the subject in the symposium, states that estimates of their importance vary from 80% to 10%; his own experience favours the lower figure. As he points out, the term "eye strain" has no exact significance and no exact meaning. Ocular headache occurs irrespective of the use made of the eye muscles. It is absent in the hypermetropic squinter, who must over-exert his eye muscles, and may be present in the subject of low degrees of myopia, who makes little demand on his eye muscles.

¹ Edinburgh Medical Journal, March, 1948.

Headache does not accompany monocular vision though one eye is "doing all the work". The squinter who sees with only one eye thus escapes headache by avoiding the effort of coordinating his eye muscles to obtain binocular vision. Good or bad vision is not significant in itself, but unequal vision in the two eyes may cause headache. Imbalance of the extrinsic ocular muscles often causes headache. A refractive error may throw out of gear the neuro-muscular mechanism which is concerned with binocular vision, but

if the achievement and maintenance of binocular vision are not made more difficult headache is not likely to be caused whether refractive error is present or not, and if binocular vision is difficult headache is caused irrespective of the presence of refractive error. In one-eyed persons the question does not arise and headache is escaped. The refractive error *per se* does not cause headache and the expression "eye strain" should be regarded as meaning "strain" in a figurative, not a literal, sense as one might say "frayed nerves".

Traquair considers that whether a headache is of ocular origin or not should be determined from the study of the type of the headache. Routine examination of the eyes frequently reveals refractive errors, but these are not necessarily productive of headache. Correction of a refractive error may thus have no effect on headache, though the ordering of spectacles may be an effective psychotherapeutic measure in certain cases. Ocular headaches are common in young adults, especially females, who have much near work to do. The pain may be described as behind the eyes or in the temples, sometimes in the occiput, rarely in the vertex. It is not generalized, or limited to one side as in migraine, or localized as in supraorbital neuralgia. It is usually of a dull aching character and the more severe it is the less likely it is to be ocular in origin. It is usually related to work and does not interfere with sleep. Debilitating conditions may lessen the capacity to overcome a refractive error that would not cause headache in a healthy person. Psychogenic factors are often the real basis of an apparent ocular headache. Treatment consists in the prescription of suitable spectacles to relieve any difficulty in the way of achieving and maintaining efficient binocular vision. In all cases it is necessary to examine and treat the patient and not only the eyes.

According to A. Brownlie Smith no less than 41 conditions associated with the ear, nose and throat have been listed among the causes of headache. However, he confines his comments to headache arising from infection of the nasal accessory sinuses, describing the characteristic features of the headache from each main sinus or group of sinuses. That from the frontal, sphenoidal and ethmoidal sinuses can often be recognized. It is debatable whether headache arises directly from antral infection. Smith utters a warning against the danger of blaming a moderate degree of sinus infection for an otherwise unexplained headache—there may be no connexion between the two. On the other hand headache almost certainly of sinus origin may occur in the absence of demonstrable sinus affection, though this is difficult to explain, particularly as the conception of a vacuum in a sinus has lost a good deal of favour. Many headaches attributed to sinus affection are probably psychogenic in origin. W. M. C. Harrowes, discussing the psychological aspect, points out that everybody knows quite well that worries and problems do produce headaches in many people and

so in modern parlance a "headache" has come to mean a worry or a problem. Most people believe that a pain in a certain locality means that there is something wrong there. Headaches mean to them that something is wrong with the brain; often a fear arises of overtaxing the brain and the situation gradually becomes more complex. Clinically every type of psychiatric reaction may show headache at times as a symptom; in the most important group, the neuroses, a great variety of other head symptoms also may occur. The psychological aspect of migraine is also important according to Slater. Migraine can usually be recognized by its characteristic features and elaborate investigation is unnecessary. A most important part of treatment is teaching the patients to order their lives aright. If we revert to Alexander's paper in conclusion we find again prominence given to psychogenic headache. He has four questions that he asks when considering a patient with headache: (i) Does the explanation lie within the skull in the shape of some organic change? (ii) If the cause does not lie within the skull, does it then rest in the bones themselves or their coverings? (iii) If the cause of the headache is not local, that is, does not lie inside or outside the skull, can it be related to a physical cause elsewhere in the body? (iv) No adequate physical explanation being forthcoming, must the headache be regarded as psychogenic or psycho-somatic in origin? Most headaches met with in practice come, he says, into this final category. Yet it is surely significant that he puts this question last. It is important that organic causes be excluded before we attribute a headache to man's struggle to maintain supremacy over his increasingly complex environment.

Current Comment.

POST-EMBRYONIC BONE GROWTH.

THE problems of embryonic development are of such bewildering complexity that the biologist is often tempted to postulate a guidance beyond the mind of man to comprehend. He wonders why it is that so many young creatures emerge from egg or uterus with normal structure. We are often apt to forget that in post-embryonic growth there are also problems not apparently so intricate or baffling, but still of importance and still awaiting elucidation. We think we understand how a bone like the femur elongates through epiphyseal activity, but has anyone told us why the right and left femora display the same rate of growth? Again, the other structures of the thigh must adopt a range of extension adjusted to the increasing length of the femur. In what manner does a nerve trunk, such as the sciatic, stretch out to fit in with femoral increment? When a surgeon excises a portion of injured or diseased nerve trunk and stitches the two ends together, often finding it necessary to place the limb in one extreme of posture to allow this, he knows by experience that the curtailed nerve trunk will resume its former length after a not very great interval of time; but just how this happens the histologist has not convincingly informed us.

The adaptation of the brain case to the growing brain within has recently been studied by a new but simple technique. N. A. Barnicot of University College, London, discovered that osteoclasts in supravital staining take up neutral-red selectively and this allows the investigator to determine by depth of colour the concentration of osteoclasts in any portion of bone when viewed under the dissecting microscope or to observe the individual cells

with the high power.¹ Mice, normal and mutant abnormal, were employed in the research. As the parietal bone enlarges, and it does this rapidly in the first week after birth, the osteoclasts spread over a larger area, then thin out in the central region, becoming confined to a peripheral zone under the extending margins, and finally disappear. As the parietal bone grows its radius of curvature, both sagittal and coronal, increases and osteoclasts are found to be busy eroding the inner surface at the margins to make this possible. The conclusion of Brash that absorption is mainly confined to the inner surface of the cranial vault is confirmed, but some osteoclasts are also thinly spread out on the outer surface of the bone.² The interesting suggestion naturally presents itself that the alteration of the cranial bones is determined by the growing brain within. The action of a brain tumour in causing erosion of the adjacent bony vault is well known. But Barnicot is hesitant to adopt this as the leading factor concerned. Actually le Gros Clark transposed the causal sequence and assumed that the brain sulci are to be explained by folding conditioned by the restriction of the bony envelope.³ Barnicot puts as a possible alternative, and seems inclined to accept it, that "the bones have a certain autonomy and pursue an independent growth pattern". In another place he states: "The concentration of osteoclasts on the supraoccipital region certainly invites correlation with the growth of the cerebellum, but on the lateral wall of the cranial cavity the distribution gives the impression that each bone is being modelled as an independent entity." And again: "The pattern is largely determined by other factors [than mechanical] which one may call intrinsic to the bone in the absence of fuller knowledge." Such an hypothesis really brings one back to the directive centres of the embryo and suggests that the problems of antenatal and post-natal growth are largely identical.

HYPERPIESIS OF RENAL ORIGIN.

THE Josiah Macy, Junior, Foundation was formed in 1930 through the generosity of Mrs. Kate Macy Ladd, who in her original letter of gift hoped that the directors would be more interested in "the architecture of ideas than in the architecture of buildings".⁴ The transactions of the first conference, April 24 to 25, 1947, held in New York, have been published and have only recently come to hand in Australia. The title is "Factors Regulating Blood Pressure", but the contents, representing the views of thirteen members, four associates and two guests, are concerned exclusively with the origin and nature of arterial hyperpiesis or, as they call it, hypertension. As might be expected the opinions of different participants in the debate did not always agree. Lewis Dexter, of the Harvard Medical School, was enthusiastic about the results of sympathectomy; George E. Wakerlin, of the Illinois College of Medicine, agreed concerning the good results, but limited them to 10% of the treated; William Goldring, of the New York University College of Medicine, thought the figure 1% nearer the actuality. Naturally much of the discussion centred round the humoral hypothesis regarding the cause of hyperpiesis. In the first place there is the renin system containing hypertensin (angiotensin), the pressor agent; renin, the kidney enzyme; hypertensinogen, the plasma substrate from which hypertensin is formed by the action of renin; and lastly hypertensinase, probably a group of enzymes, widely distributed in the body, which destroys hypertensin. Four delegates from the Cornell University Medical College put in a strong plea for the existence of a vaso-excitator material which they call VEM, and which they claim is not formed by the action of renin

on a globulin substrate in the blood, but is elaborated in the kidney substance. Further details are given in support of the contention that VEM is a separate entity and of major importance in hyperpiesis. The staunchest supporters of the renin hypothesis candidly admitted that this body has not been found in the blood of patients suffering from chronic hyperpiesis, though it is easily detected in the acute phase. Other humoral agents mentioned were certain pressor amines; also adrenaline in a limited number of cases. The effects of denervation of the carotid sinus are also described in these transactions.

Three general points of view are held concerning the role played by the kidney. Firstly, some doubt if the kidney has anything to do with hyperpiesis; these are, however, a small minority. In the second category are those who hold that diastolic hyperpiesis, including "essential hypertension", is always of primary renal origin. One may add to the discussion here that the absence of demonstrable lesions in the kidney is not an argument against this view, for one can be reminded that the progress of diabetic research was delayed twenty years by the failure of pathologists to find anything wrong in the pancreas in fatal cases. In the third place, there are those who believe that the kidney is the mediator of hyperpiesis, but that, in addition to primary renal disease, extrarenal agencies act on the kidney to produce the arterial tension; for example, basophile tumours of the pituitary and adrenal adenomata are accompanied by hyperpiesis with far greater frequency than can be accounted for by coincidence. In the discussion the importance of immunological studies of the renin complex was stressed, though the results to date are conflicting. That treatment of hyperpiesis is too often symptomatic and not directed to the cause was candidly admitted.

Throughout the discussions and indeed in most, if not all, recent contributions to this subject we find no mention made of the pioneer work of Starling carried out over fifty years ago. That perfusion of the kidney with saline solutions leads rapidly to oedema he explained by the unbalanced osmotic pressure of the kidney protein. If blood or plasma is used as the perfusion fluid under constant pressure, no formation of urine is the usual result. Starling pointed out that the afferent vessel to the glomerulus is very sensitive and frequently constricts, producing complete obliteration of the lumen; the circulation then taking place through the *arteria recta*, true and false.⁵ Later it was shown that the flow should be pulsatile because the propulsion of the glomerular filtrate down the renal tubes is conditioned largely by the sudden expansion of the glomerular whorl, almost an arterial *rete mirabile*, driving the filtrate onwards. The beneficial results of surgical decapsulation can be explained by restoration of the pulsation. Interference with kidney function leading to hyperpiesis by means of investment of the organ with a non-expanding coat finds here also a simple explanation. Starling was of the opinion that if the kidneys are incapable through any cause of producing adequate glomerular filtrate, then automatically the blood pressure will rise to rectify the condition. At the time he had not discovered and named the hormones and so sought in nerve reflexes the mechanism of this adjustment of the blood pressure to the kidney's needs. Had he lived he would have welcomed, we can well imagine, the humoral hypothesis, though whether nervous agencies are completely ruled out has by no means been settled. Since this American conference took place the volume of research on kidney hyperpiesis has increased. One of the latest contributions emanates from the school of physiology in the University of Melbourne. G. Reid and H. A. Jenkins show that cobra venom causes a liberation of renin from the kidney which cannot be explained by ischaemia, the most usual causal procedure in the production of experimental hyperpiesis in the laboratory animal.⁶

¹ *Proceedings of the Royal Society, Series B*, Volume CXXXIV, 1947, page 467.

² *Edinburgh Medical Journal*, Volume XLI, 1934, page 363.

³ "Essays on Growth and Form", 1945.

⁴ "Factors Regulating Blood Pressure: Transactions of the First Conference", April 24-25, New York. Obtainable from the Josiah Macy, Junior, Foundation, 565, Park Avenue, New York. Price: \$1.90 per copy.

⁵ In a review in *Nature* (May 1, 1948) of the book "Studies of the Renal Circulation" by Trueta, Barclay, Franklin, Daniel and Prichard, attention is drawn to "the two potential circulations" of the kidney and the statement is made that this "has hitherto been entirely overlooked".

⁶ *The Australian Journal of Experimental Biology and Medical Science*, Volume XXVI, May, 1948.

Abstracts from Medical Literature.

OPHTHALMOLOGY.

Senile Entropion.

A. KETTSEY (*The British Journal of Ophthalmology*, May, 1948) discusses the genesis of senile entropion and describes his operative technique for cure of this condition. Normally the lower lid is kept in position by the elasticity of the tarso-orbital fascia with the embedded inferior tarsal muscle and by the tone of the orbicularis muscle. Of these two factors the latter is the more important. He maintains that most operations for entropion leave unattacked the decisive factor of the turning in, the accumulation of the orbicularis muscle in the margin, or they touch it only secondarily and insufficiently with consequent recurrence of the entropion. In his opinion solution to the problem is excision of the orbicularis muscle of the lower lid without anything further. Under local anaesthesia a skin incision is made below the line of the eyelashes, the skin is undermined down as far as the orbital margin and the palpebral part of the orbicularis as well as the lower portion of the muscle is thoroughly extirpated until tarsus and orbital fascia are exposed. No sutures are required and results are lasting. The author claims that over-correction is impossible; removal of any skin is forbidden.

Iridoschisis.

ARNOLD LOEWENSTEIN, JOHN FOSTER AND S. K. SLEDGE (*The British Journal of Ophthalmology*, March, 1948) describe another case of a rare condition which they have termed iridoschisis—a condition of iris atrophy in which ruptured radial fibres of the iris floated freely at one end in the aqueous. A male subject, aged forty-six years, had suffered a broken nose and a "black eye" on the right side. Ten weeks later he noticed that the colour of the iris of the right eye had altered. The iris of the right eye was darker blue than that of the left, and on it were large areas of brownish atrophy most pronounced in the lower half. Here and there fibres of the anterior layer of the iris had sprung away, and the pupillary ends of some of them had adhered to the posterior corneal surface near the limbus. The tension in this eye was 35 millimetres of mercury (Schlötz). A basal iridectomy was performed and the excised iris examined histologically. The authors regard the case as traumatic in origin.

Pterygium.

EMANUEL ROSEN (*The British Journal of Ophthalmology*, May, 1948) describes an operation for pterygium. The head of the pterygium is carefully dissected off the cornea to the limbal area and the conjunctiva is then separated from the limbus for three millimetres above and below. A double-armed suture is then inserted about one millimetre from the head of the pterygium going from the conjunctiva to the episcleral surface. The pterygium is then folded back upon itself so that episcleral tissue is in contact with episcleral tissue and the double-armed suture is brought

out through the centre of the caruncle. The episcleral tissue below the pterygium should be undermined carefully and completely, so that no adhesions hold back the folded pterygium. The suture is then pulled tightly and tied over a small rubber button. The edges of the conjunctiva are sutured together in a horizontal line starting from the buckled end of the pterygium and going to the limbus; 6/0 silk should be used for these sutures. The suture through pterygium and caruncle should be retained for ten days.

Sympathetic Ophthalmia.

BERNARD SAMUELS (*American Journal of Ophthalmology*, April, 1948) gives a review of the present-day knowledge of sympathetic ophthalmia. He discusses various aspects of the process dealing *seriatim* with openings of the globe, accidental and surgical, complications in the healing process, the minute anatomy of the specific infiltration with the exciting and sympathizing eye, its occurrence in different countries, points of similarity and points of difference from tuberculosis, clinical signs, pathogenesis and treatment, and prognosis. The author lays down definite indications as to when an injured eye should be enucleated.

Eye Hazards and Safety Practice.

A. KEFALAS (*British Journal of Industrial Medicine*, April, 1948) presents a review of 14,722 eye accidents occurring in the Wearside shipyards from 1942 to 1946 inclusive. The reports of the majority of the accidents come under the headings of "flash", "burns", "foreign bodies" and "injuries". The author discusses the problems associated with safety devices and describes a protective appliance designed, whilst protecting the eye against danger from all directions to give unobstructed vision all round, not to touch the face, not to close in the orbit and not to fog. He sets out his ideas on general preventive measures, particularly the right education of the workers, and states that the essence of the work is to direct the attention of the workers to certain dangers and their origins, to seek measures to prevent their recurrence, and to do this without needlessly alarming the workers or undermining their confidence.

Glaucoma.

P. C. KRONFELD AND H. I. MCGARRY (*The Journal of the American Medical Association*, April 10, 1948) present a five-year follow-up of 225 eyes with wide-angle glaucoma and 100 eyes with narrow-angle glaucoma. They state that the purpose of the survey was to determine in a representative group of cases the course of so-called primary glaucoma under the influence of treatment intended to lower the ocular tension. Because of gross differences in the response to such treatment, it was found advisable to separate the wide-angle from the narrow-angle glaucomata. The treatment accomplished "normalization", "seminormalization" or "nonnormalization" of ocular tension. Only eyes that remained in that respective state for at least five years were included in the study. The course of the disease, whether stationary or progressive, after "normalization" of tension, showed a strong dependence on the stage of the

disease present when the "normalization" became effective. In eyes with early stages of "wide-angle" glaucoma the course of the disease was closely dependent on the prevailing tension range, "normalization" of tension resulting in a high percentage of arrest of the disease ("cures"). "Seminormalization" of tension at an average level of about 28 millimetres of mercury was sufficient to preserve the existing visual function in two-thirds of eyes with early wide-angle glaucoma. Eyes with later stages of glaucoma showed a strong tendency towards further progression of the disease despite "normalization" of tension. The very centre of the visual field seemed to exhibit a specific resistance to the glaucomatous disease. The chances of survival of vision after "normalization" of tension were estimated for the respective stages of the disease.

Hydatid Disease of the Orbit.

SIR HENRY HOLLAND (*The British Journal of Ophthalmology*, July, 1948) describes his experience with eight cases of hydatid disease of the orbit. He states that his findings agree with those of Cabant, namely, that the cysts generally lie in or about the muscular cone. In no case was a pericystic membrane seen. Pain is seldom a predominant feature and may be absent. Proptosis varies according to the duration of the condition. Vision is not usually affected. Conditions requiring to be differentiated include dermoid cyst and the varieties of exophthalmic ophthalmoplegia. The diagnosis may be clinched by aspiration of the tumour and microscopic examination of the contents after the patient has been prepared for operation. If the typical hooklets are seen, the needle should be left in place and the cyst excised forthwith. The technique of excision is discussed. The author states that it is evident from this series of cases that the earlier the patient comes for treatment the better, because of the difficulty in operative removal of a large cyst.

Retinitis Pigmentosa.

I. BIRÓ (*The British Journal of Ophthalmology*, July, 1948) discusses the present state of the problem of retinitis pigmentosa. He states that it cannot be regarded as a uniform disease, and emphasizes the dual pathogenesis of the condition as described by Redslob, namely, inherited and "sui generis" or "autonomous". The inherited group is further divided into cases of recessive and cases of dominant inheritance. The author states that in contradistinction to the hereditary form the autonomous is a sequel of the acute exanthemata, inflammations, toxic diseases, permanent circulatory impairment *et cetera*. The hereditary and autonomous forms have certain clinical differences. The possibility of permanent improvement in the autonomous form cannot be excluded, but no treatment can be expected to influence the inherited disease.

Dacryocystitis in Infancy.

J. V. CASSADY (*American Journal of Ophthalmology*, July, 1948) presents a review of the literature on the subject of dacryocystitis in infancy and an account of the relevant embryology and developmental anatomy illustrated

with original photomicrographs prepared from subjects at various stages of embryonic and fetal development. He states that tears begin to form and appear at about the age of three and a half weeks. In a discussion on treatment he sets the incidence of dacryocystitis in infancy at somewhere between 1.75% and 5.0% and states that prompt subsidence of the condition can be obtained as soon as the lumen of the naso-lachrymal duct is adequately patent. His experience has shown that early probing of the duct produces no untoward injury providing that it is carefully and gently performed, and he considers that this is the method of choice in infants to produce prompt subsidence of symptoms.

OTO-RHINO-LARYNGOLOGY.

Audiograms in Otosclerosis.

W. MCKENZIE (*The Journal of Laryngology and Otology*, May, 1948) has made a comparison between air conduction audiograms in otosclerosis at different ages. He states that otosclerosis, as shown by the audiograms, is steadily progressive, and that a halt of more than fifteen years is unusual. The age of the patient may influence the amount of hearing loss, apart from the length of history. The author considers that the shape of the air conduction audiogram may prove to be of more help in the choosing of subjects for the fenestration operation than age alone.

Tonsillectomy.

J. ALISON GLOVER (*Archives of Disease in Childhood*, March, 1948) reviews the problem of the indications for tonsillectomy in children. He feels that the operation is performed far too often, and in many cases because of enlargement which is physiological, associated with the developmental changes of the child between the ages of five and seven years. At this age children are entering school and meeting unaccustomed infections, and their primary teeth are decaying and often infected. The enlargement of the tonsils is a result of the organs' meeting and dealing with these repeated infections. They are in fact playing an important part in developing the immune responses of the body. Frequent colds are more often a result of sinusitis than of tonsillitis, and tonsillectomy does not cure this. Indeed the author quotes Paton, who found that respiratory infections in a girls' boarding school were more frequent in tonsillectomized girls. Similarly patients with asthma and bronchitis are not benefited by tonsillectomy. Recurrent otitis media and persistent enlargement of cervical lymph glands are widely accepted as indications for tonsillectomy, but Glover points out that in the Derbyshire school medical service a drastic reduction in the number of tonsillectomies performed over a period of several years was actually accompanied by a fall in the number of cases of otitis media and enlarged cervical glands. Concerning nephritis, the author quotes Illingworth, who showed that tonsillectomy does not prevent or cure nephritis, but may predispose to it; does not prevent it progressing to the chronic stage and may actually

cause it. He states that frequently repeated attacks of acute tonsillitis remain the most reliable indication for operation, but isolated attacks during an epidemic of respiratory infection should be regarded as a protective response rather than a reason for condemning the tonsil. The operation is never urgent and should always be preceded by a period of observation for six months after the completion of any necessary treatment to nasal sinuses and teeth.

Cerebellar Abscess.

JOE PENNYBACKER (*Journal of Neurology, Neurosurgery and Psychiatry*, February, 1948) discusses the diagnosis and treatment of eighteen cases of cerebellar abscess. Seventeen were due to mastoid infection, and in the same period the same cause accounted for twenty-two temporal lobe abscesses. Of nine patients treated before the introduction of penicillin only two survived, whereas since the use of penicillin eight out of nine patients recovered. The author points out that such abscesses can be difficult to diagnose because there is often little or no papilloedema and the spinal fluid pressure may be normal. He emphasizes the facts that headaches, vomiting and giddiness are the common symptoms and that frequently the patients tend to keep their heads bent forwards rather than to retract them. Of the clinical signs nystagmus is important. It consists of slow and coarse movements to the side of the lesion and rapid and finer movements on looking to the other side. Ataxia, particularly of the arm, is common, and dysarthria is frequent and regarded as a very ominous symptom. In most cases in the series there was some disorder of the protein or cells in the cerebrospinal fluid. Because of the constancy in the site of these abscesses, attached to the temporal bone, excision is attempted, although decompression and repeated aspiration may be all that is required in some cases. These surgical procedures have been successful with the aid of antibiotics.

X-Ray Treatment of Subacute Sinusitis in Children.

DONALD LAING (*Radiology*, January, 1948) states that he has treated over four thousand children for sinus infection over a period of ten years. He considers that 900 of these had subacute sinusitis with symptoms of a moderately severe upper respiratory infection (stuffy nose, low-grade fever *et cetera*). In all, the sinus films revealed varying degrees of infection in maxillary and ethmoid sinuses. Many of the patients had had tonsils and adenoids removed, some a three-day course of sulpha drugs. He considers that this type is suitable for X-ray therapy as chemotherapy and symptomatic measures do not produce good results and nasal packs and antral washouts are difficult. Treatment was given by an anterior field over the sinuses with screening of eyes and eyebrows. If cough is a predominant symptom the lung roots are also irradiated. In some cases with symptoms of deafness or earache, the Eustachian area was treated as well. Overlapping of fields was avoided and not more than three treatments were given to any area. If a sinus blockage was suspected a small dose (about 30r) was given to begin with and the

mother was warned about a possible reaction to the X-ray treatment. Otherwise the dose was 80r. A current of 130 kilovolts was used and a filter of three millimetres of aluminium; three treatments were given over a period of eight days with a total dose of 240r to each field. About one-fourth of the patients showed noticeable relief after one treatment; a few showed a mild reaction with increased cough and nasal discharge. Of the 900 children, 639 or 71% were cured with one series of treatments; 15% showed moderate improvement, and when the series was repeated after six weeks 55% of these were cured; 14% responded temporarily or not at all to X-ray therapy and it is suspected that in these cases an allergic factor may have been present. The author considers that the method of treatment is without risk; the skin is not affected and there is no reason to suspect danger to the pituitary gland.

A New Method of Demonstrating the Labyrinth.

OLIVER GRAY (*The Journal of Laryngology and Otology*, May, 1948) describes a method of demonstrating the anatomy of the labyrinth, together with those related structures which lie within the petrous portion of the temporal bone, by the use of monomeric methyl methacrylate, a liquid which, when heated or subjected to ultraviolet light, becomes polymerized into a solid. The resultant specimens can be handled easily without fear of breakage and are very suitable as demonstration specimens.

Some Anatomical Points in the Fenestration Operation.

M. HARTY (*The Journal of Laryngology and Otology*, January, 1948) states that in 52% of 100 temporal bones examined in the Anatomy School, University of Cambridge, the edges of the tympanic plate at the anterior and posterior squamo-tympanic sutures formed a projection of one millimetre or more into the external auditory meatus. These bony prominences may cause considerable difficulty in stripping the skin flap required for the future flap graft to be used to cover the fenestra. The folds between the *pars tensa* below and the *pars flaccida* above will generally form the hinge for the flap graft. The distance from these folds to the ampulla of the lateral semicircular canal varies between two and seven millimetres, and the lateral semicircular canal lies on a higher plane than these folds. Mobilization of the anterior fold in an attempt to place Shrapnell's membrane in direct contact with the fenestra may jeopardize the blood supply of the graft. The membranous semicircular duct lies eccentrically in the lateral semicircular canal and is attached by its outer convexity to the wall of the bony canal. This is of great importance when the perilymphatic space must be exposed without puncture of the underlying membranous semicircular duct. As the membranous duct passes forwards to join the ampulla, its location becomes more central in the bony canal and there is a more definite perilymphatic space around the membranous duct. The separation of the endosteum from the lateral semicircular duct and ampulla is thus facilitated if a start is made at the anterior end of the fenestra.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal Alexandra Hospital for Children, Sydney, on April 20, 1948. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff of the hospital.

Lead Encephalopathy and Paralysis.

DR. R. A. R. GREEN presented a child, aged two years and nine months, who was a contact of a tuberculous subject. She had been admitted to hospital with a history of persistent vomiting, irritability and screaming attacks, her condition deteriorating until, five days before admission, she became stuporose, and three days later she developed a squint. She was found to be stuporose, with a slight squint and sluggishly reacting pupils. Both ankle jerks and the right knee jerk were absent; the left knee jerk was exaggerated. Neck stiffness and Kernig's sign were found. The optic disks were pale with swollen, blurred margins and engorged veins. A provisional diagnosis was made of tuberculous meningitis. X-ray examination of the chest revealed consolidation in the upper lobe of the right lung, probably tuberculous in nature, and the result of the Mantoux test was positive with a dilution of 1:1000. The cerebro-spinal fluid contained five cells per cubic millimetre, 100 milligrammes of protein and 690 milligrammes of chloride per 100 millilitres; glucose and globulin were present. The X-ray appearance of the skull suggested a slight rise of intracranial pressure. However, a blood count revealed 40,000 punctate basophile cells per cubic millimetre and the X-ray appearances of the end of the diaphyses of the long bones suggested a mild degree of lead poisoning. A final diagnosis was made of lead intoxication, apparently resulting from the child's habit of chewing various painted articles. The child still had a right-sided hemiparesis, but was improving. Calcium gluconate and a diet of high calcium content were being administered. It was considered that the child was also suffering from a primary tuberculous infection.

Microcephaly.

DR. R. J. TAYLOR presented a baby, aged four and a half months, with microcephaly. The child had a small head, the fontanelles and suture lines having closed. Twitching of the hands and face and stiffening of the body, lasting up to two minutes, had been occurring for the previous two months; there was no loss of consciousness and the child did not seem to be put out in any way, stopping in the middle of a fit to yawn or grin. X-ray examination confirmed the diagnosis.

Atelectasis of the Right Lung Apex.

Dr. Taylor next showed a girl, aged eight years, who had been tired and listless for five months before admission to hospital with cough and mild hæmoptysis for three months. She was pale with clubbed fingers and had mild intermittent bouts of pyrexia. X-ray examination revealed an area of consolidation in the upper lobe of the right lung and the radiologist suggested the presence of an abscess. Bronchoscopic examination on three occasions showed the presence of blood-stained mucus in the right bronchus and trachea. A bronchogram revealed obstruction of the right upper lobe bronchus, which was partly filled but presented a tapering and constricted appearance at the base indicating pressure and obstruction; the posterior part of the upper lobe was completely atelectatic. The radiologist commented that in an adult the appearance would be characteristic of a tumour, but that inflammatory changes could produce the same appearance. No acid-fast bacilli, hooklets or scolices were found in the sputum; non-hæmolytic streptococci, a few hæmolytic streptococci and *Streptococcus viridans* were grown on blood agar. The result of the Casoni test was negative and the complement-fixation test for hydatid yielded an incomplete positive result. The results of the Mantoux test were negative for dilutions of 1:1000 and 1:100. The hæmoglobin value of the blood was lowered, the total white cell count moderately increased.

Congenital Syphilis.

DR. W. P. MACCALLUM presented a patient, aged twenty-three months, suffering from congenital syphilis. This child had been breast fed for three months, vomiting persistently, and had always been difficult about feeding. Otitis media,

measles and pertussis had retarded progress and the child was unable to walk. Two days prior to admission to hospital he had suddenly gone limp on the left side and had remained so. On admission he looked fairly well, but was sweating. He had left facial weakness and the limbs on the left side, which were not used, were atonic. All reflexes were hyperactive and symmetrically equal. Bossing of the skull was present and examination of the fundi showed bilateral secondary optic atrophy with some pepper and salt pigmentation. The results of Wassermann and Kline tests were positive. The child was treated with penicillin, arsenic and bismuth and improved greatly during the first two weeks in hospital; he became brighter mentally, recovered some use of the left arm and leg and lost the left facial weakness. Since those first weeks he had improved only slightly.

Hypertrophic Osteoarthropathy.

Dr. MacCallum then presented a patient, aged six years, who had been treated in 1945 for acute rheumatism. Recently he had developed increasing lethargy and his father noticed a change in the appearance of his hands and fingers. Recurrent attacks of pains in the limbs, anorexia, breathlessness on exertion and swelling of the feet had led up to his admission to hospital. On examination he was a thin, fair child with an enlarged heart, tachycardia, a soft systolic apical murmur and an increased pulmonary second sound, a non-painful swelling of the left ankle and pronounced clubbing of fingers and toes. X-ray examination revealed periosteal reaction and probable hypertrophic pulmonary osteoarthropathy. The blood sedimentation rate was much increased. A moderate degree of anaemia was present. The electrocardiogram showed sinus arrhythmia, sinus tachycardia and a PR interval at the upper limits of normality. No organisms were grown from the blood. The child had become more ill and pale looking, the murmurs had changed and the temperature chart had become irregular. His stools had become offensive and contained macroscopic blood at times, but no pathogens were grown from them. A patch of consolidation of uncertain origin had developed in the left lung.

Glycogen Disease (von Gierke's Disease).

DR. S. G. BRADFIELD presented two sisters, aged ten and seven years respectively, suffering from glycogen disease. He explained that it was a congenital disorder of metabolism, characterized by an excessive accumulation of glycogen in the tissues; the liver was almost invariably involved, and other organs such as the kidneys and heart might be affected. The presenting symptoms were constant tiredness, "bilious" turns if much fat was present in the diet and a very large abdomen. The two children presented each had stunting of growth, thin, puny extremities, wasted buttocks and a prominent abdomen; the liver was grossly enlarged, smooth and not tender, but there was no spleen or lymph gland enlargement. Dr. Bradfield gave details of the results of investigations in 1944 when both girls had had a considerable degree of macrocytic hyperchromic anaemia, an increased blood cholesterol content, a deficient response in the blood sugar level to the injection of adrenaline, and acetone and diacetic acid present in the urine; for one child a normal curve was obtained from the glucose tolerance test with evidence of a lowered renal threshold, and for the other the fasting blood sugar level was low, a "lag curve" being obtained from the glucose tolerance test. For treatment the children had been given a diet with a relatively high carbohydrate and a low fat content with *Thyreoidium Siccum* in appropriate doses. Liver extract and vitamin C had also been administered. The blood cholesterol level was still raised, but improvement had occurred in the results of other investigations.

Rickets and Bronchospasm.

Dr. Bradfield then presented a boy, aged two years, who had had recurring attacks of bronchitis all his life with one attack of severe wheezing. He was always subject to sweats. This boy was the fat child of the family, three older brothers and sisters having been thin. He had suffered from measles and pertussis. A full-term baby, he had been breast fed for nine months, and then received cow's milk and the usual clinic diet; clinic emulsion was given from the age of nine to eighteen months and "Potantol" ten drops three times a day from the age of nine to twelve months. On examination he was a fat flabby child. His skull was square and bossed with a circumference of twenty inches. Dentition was normal. Harrison's sulcus was present and the costo-chondral nodes were enlarged. The abdomen was prominent, being of the "pot-belly" type. He was knock-kneed. X-ray examination revealed slight bronchitic

changes in the chest and mild rachitic deformity of the tibia. Treatment being given included "Potantol" twenty minims three times a day, heliotherapy, ephedrine, *Mistura Lobelia Composita* and built-up heels to correct the knock knees.

Osteomyelitis due to Salmonella Organisms.

DR. J. STEIGRAD presented a boy, aged three and a half years, who ten days before admission to hospital had developed sore throat, vague abdominal pain and nausea, followed in three days by pain in the left thigh where swelling soon became visible. Sulphadiazine was administered without effect. On his admission to hospital his temperature was 100.2° F., and there was a diffuse swelling of the left thigh with a point of maximum tenderness over the middle of the femoral shaft. The intramuscular administration of penicillin was started and the patient's general condition remained good for twelve days, the temperature never exceeding 100° F.; the swelling did not subside. Then the temperature rose suddenly and deep inguinal adenitis was noticed. Two days later the presence of a subperiosteal abscess was diagnosed; this was incised, about three-quarters of a pint of pus was evacuated and the wound was irrigated with "Monacrin". A culture of organisms of the salmonella group was grown from the pus. Treatment with streptomycin was instituted with immediate and continued favourable response.

Tuberculous Cervical Adenitis.

Dr. Steigrad then presented a boy, aged two and a half years, who had been admitted to hospital with a swelling on the right side of the neck which had been present for nearly two weeks and had increased in size in spite of penicillin injections. A mass of matted glands and several very firm discrete glands were present on the right side of the neck with no fluctuation or erythema. There was slight enlargement of the axillary and inguinal lymph glands. A punched-out ulcer was present on the upper part of the right side of the nose with a small area of surrounding erythema. Further penicillin injections produced no improvement. A cervical abscess developed and was incised, thick yellow pus containing acid-fast bacilli being obtained. Four more abscesses were later incised and "Promin" jelly was instilled without appreciable benefit. Then streptomycin injections were commenced and continued for fourteen days without signs of toxicity; the sinuses closed during this period, becoming surface crusts which were still diminishing in size. The ulcer on the nose was treated unsuccessfully with penicillin cream; after a few weeks' treatment with "Promin" jelly it became dry and crusted and had remained in that state ever since.

Giant Cell Tumour of the Mandible.

DR. G. M. B. HALES presented a boy, aged eight years, whose jaw had been submitted to X-ray examination because of failure of a socket to heal after tooth extraction. As a result he was referred to hospital. He was found to have a small hard swelling near the left angle of the mandible, the swelling being fixed, non-tender and smooth. Inside the mouth there was a small swelling at the position of the left lower second molar, extending upwards alongside and including the ascending ramus. Examination of a biopsy specimen revealed a giant cell tumour of bone, which was removed from an inside approach by morcellation.

Hirschsprung's Disease and Mongolism.

Dr. Hales then presented a mongol boy, aged eight years, who had always required aperients and enemata since birth; the abdomen had not been noticed to be unduly large. Apart from the stigmata of mongolism, nothing significant was found on examination. The administration of "Prostigmin" and of acetylcholine produced little effect on the symptoms and bilateral lumbar sympathectomy was undertaken. After operation there was abdominal distension relieved by the passage of a rectal tube for five days. Thereafter enemata were given daily with good results and within a month a normal bowel action was occurring each day after a small olive oil enema. One week later the child was having spontaneous bowel actions.

Laryngeal Papilloma.

DR. N. H. MEACLE presented a girl, aged four years, whose birth had been able to articulate only in a whisper and had occasional periods of heavy breathing. About eight months before the meeting she developed constant and increasing difficulty in breathing which terminated in attacks of acute laryngeal obstruction. She was found to have a laryngeal papilloma which was removed piecemeal at six

separate operations. She was well for a short period, but then developed acute pharyngitis and mild laryngitis, and respiratory distress recurred. The polypoid tissue was again removed and the airway improved. Two months later she developed acute follicular tonsillitis, the laryngeal obstruction recurred and she became cyanosed and fatigued. This time tracheotomy was performed.

NOTICE.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioner has been released from full-time duty with His Majesty's Forces and will resume civil practice as from the date mentioned:

Dr. T. Edward Wilson, 201, Macquarie Street, Sydney (September 8, 1948).

Medical Societies.

THE AUSTRALASIAN ASSOCIATION OF PSYCHIATRISTS.

A MEETING of the Australasian Association of Psychiatrists will be held at Melbourne on October 19, 20 and 21, 1948. The programme is as follows.

Tuesday, October 19.

- 10 a.m.—Council meeting at the British Medical Association council room.
- 1 p.m.—Luncheon for members of the Council at the Florentino Café.
- 2 p.m.—General meeting.
- 2.15 p.m.—Dr. D. F. Buckle: "The Functions of a Clinical Psychiatrist." Demonstrations on mental testing provided by members of the staff of the Department of Psychology, University of Melbourne, at the Psychology School, University of Melbourne.
- 8.15 p.m.—Presidential address to be delivered by Professor John Bostock ("A Psychiatric Centenary") at the Royal Australasian College of Surgeons Hall. (Academic dress.)

Wednesday, October 20.

- 10 a.m.—At the British Medical Association Hall: Dr. F. W. Graham: "Post-Graduate Training in Psychiatry"; Dr. A. Stoller: "The London Mental Health Conference"; Dr. P. Dane: "Group Psychotherapy".
- 2.15 p.m.—Clinical demonstrations of cases of leucotomy at the Royal Melbourne Hospital lecture theatre (tentative).
- 6.30 p.m.—Dinner at the Hotel Windsor, followed by informal discussion.

Thursday, October 21.

- 10 a.m.—Combined meeting in association with the Royal Australasian College of Physicians at the Royal Australasian College of Surgeons lecture theatre: "Medical and Psychological Aspects of Dyspepsia." Speakers: Dr. Ian McLean, Dr. D. Arnott, Dr. David Ross, Dr. John Bolton and Dr. J. F. Williams.

All members of the British Medical Association are invited to attend the presidential address by Professor John Bostock on October 19, and any other session listed on the programme.

Correspondence.

PRIMITIVE BLOOD TRANSFUSIONS.

SIR: I was a student during the period when the late Professor D. A. Welsh was at the zenith of his success and popularity, and so the obituary notice which appeared in your columns some weeks ago aroused many happy recollections of him both as a man and a teacher. The reference to blood transfusions by means of the hypodermic syringe was of special interest, because I was privileged to assist in a very minor capacity in such a transfusion carried out by

"Taffy" in a private house at Belmore for a hæmophilic patient who was under the care of my brother. Browsing through the writings of that amiable old scamp Samuel Pepys, who seems to have been wide awake to most things happening around him, and was always ready with his own comment on any subject, from the shape of his lady friend's leg to the quality of a bishop's sermon, I came across the following titbits:

(November 14, 1666.) "At the meeting at Gresham College tonight . . . there was a pretty experiment of the blood of one dog let out, till he died, into the body of another on one side, while all his own run out on the other side. The first died upon the place, and the other very well and likely to do well. This did give occasion to many pretty wishes, as of the blood of a Quaker to be let into an Archbishop, and such like; but as Dr. Croone says, may, if it takes, be of mighty use to man's health, for the mending of bad blood by borrowing from a better body."

(November 16.) "This afternoon I met Mr. Hooke, and he tells me the dog which was filled with another dogs blood . . . is very well, and doubts not of its being found of great use to men."

On November 21 he tells of "a poor and debauched man, that the College have hired for 20s. to have some of the blood of a sheep let into his body. . . . They purpose to let in about twelve ounces; which, they compute, is what will be let in a minutes time by a watch." The sheep idea seems to have been discarded. Perhaps wiser counsels prevailed. Under date November 30 we read: "I was pleased to see the person who had his blood taken out. He speaks well . . . saying that he finds himself much better since . . . but he is cracked a little in his head. . . . The first sound man that ever had it tried on him in England, and but one that we hear of in France."

Yours, etc.,

SYDNEY J. WOOLNOUGH.

Hazelbrook,
New South Wales,
Undated.

FIBROCYSTIC DISEASE OF THE PANCREAS: A REVIEW OF FOURTEEN CASES.

SIR: Dr. David Pitt is to be congratulated on his fine review of fourteen cases of fibrocystic disease of the pancreas, presented in the journal of January 24, 1948. There are several points about which I feel further discussion is warranted.

First, with regard to the function of the pancreas in preventing the development of a fatty liver, Dr. Pitt quite rightly refers to the original case of the formation of fatty livers in depancreatized dogs maintained on insulin. However, the analogy between the development of fatty liver and cirrhosis in fibrocystic disease of the pancreas and its experimental production is closer than this single experiment would demonstrate.

If the pancreatic ducts are ligated, the pancreatic secretion can no longer reach the intestine, and the acinar cells degenerate. Subsequently the animal develops a fatty liver. That this change is due to loss of exocrine secretion, and is not due to any such hypothetical endocrine substance as "lipocalc", has been amply demonstrated. Thus, it can be said that pancreatic juice is necessary for the breakdown of foodstuff to factors which will prevent fatty liver, that is, lipotropic factors. Choline, methionine, lecithin, and betaine all have lipotropic activity and these substances have been shown to be choline precursors. If choline is fed to either depancreatized or duct-ligated animals, fatty livers will not develop, and conversely, if a fatty liver is present the feeding of choline will restore the liver to its normal state. On the other hand, it has been demonstrated that if animals are placed on low choline diets they will develop fatty liver without the aid of any operative procedure, and can be restored to normal by feeding choline. More recently it has been observed in humans that, if the available diet is very low in protein, atrophy of the acinar cells of the pancreas results, and in consequence of the pancreatic malfunction, the liver becomes infiltrated with fat. The clinical observation of increased liver size and the positive signs of liver dysfunction following upon failure of secretion of pancreatic enzymes has also been made on children who existed on diets extremely low in protein during the siege of Budapest. In all such cases, whether experimental or clinical, where fatty livers have been produced they have been shown to progress to cirrhosis of the liver, provided the conditions under which the fatty liver was produced are maintained. In experimental animals the development of this type of

cirrhosis has been shown to be prevented by feeding choline. Thus it would seem that choline, or a choline precursor, is necessary to prevent the development of this type of fatty liver and its subsequent cirrhosis. As can readily be supposed, there are other factors, such as the protein, fat, carbohydrate content of the diet and their balance, the vitamin B₁ content, a balance between certain amino acids, a balance between certain proteins and substances with labile methyl groups, and other nutritional factors as yet not well known.

This rather brief summary should be sufficient to illustrate the vital importance of choline in the dietary. Let us now turn to the clinical applications of the above findings.

In fibrocystic disease of the pancreas Dr. Pitt recommends a diet consisting essentially of milk, Benger's food, egg white and casein. Both milk and Benger's food have low choline content. The choline content of egg white is extremely low (less than five milligrammes per 100 grammes of white). But egg yolk, it should be noted, is extremely high (greater than 1700 milligrammes per 100 grammes of yolk). Ordinary casein has been shown to be useless in preventing the formation of fatty livers in animals with no pancreatic secretion, and even in normal animals liver damage is produced when the casein content of the diet is below 8% to 10% of the total. However, casein, when normally hydrolysed, has good lipotropic activity, probably due to its high methionine content, methionine being a precursor of choline. Thus on the diet recommended by Dr. Pitt, the question of whether the child gets sufficient choline is dependent upon the efficiency of the administered pancreatin, and this efficiency, being dependent upon several variables, is likely to be a rather hit or miss affair.

Since there is little or no alkali secretion from the pancreas in this disease, it is obvious that the acidity due to gastric secretion will not be neutralized until the food is some distance along the intestinal tract. If the child has achlorhydria, then the efficiency of the administered pancreatin will probably be quite good, but unfortunately this is a long chance; in fact, in experiments on dogs it is found that ligation of the pancreatic duct results in hypernormal gastric acidity which persists for many months. Again, it has been known for many years that if pepsin is present together with trypsin in an acid medium the pepsin will destroy the activity of the trypsin; hence the action of the trypsin contained in Benger's food is probably minimal. Lastly, there is certain evidence that *in vitro* the rate of liberation of methionine from protein (and this would be the lipotropic substance liberated from casein) proceeds at a much slower rate than other amino acids, so that even when the pancreatin does act, its action may occur too far down the alimentary tract to bring about the efficient liberation of methionine, although the situation in regard to other amino acids may be satisfactory.

Methionine is more expensive to buy than choline, so that the evidence presented seems to indicate that, in addition to the therapy outlined by Dr. Pitt, patients with fibrocystic disease of the pancreas should also receive by mouth approximately one to two grammes of choline chloride per day in an effort to prevent the development of fatty and cirrhotic livers.

Yours, etc.,

DAVID MONK ADAMS.

Banting and Best Department of Medical Research,
University of Toronto,
Toronto 5, Canada.
June 9, 1948.

AN ENGLISH REPORT ON THE REMUNERATION OF CONSULTANTS AND SPECIALISTS.

SIR: In your leading article "An English Report on the Remuneration of Consultants and Specialists" (August 7, page 167) your comment on the registration of specialists in Queensland might cause misunderstanding. I refer to the statement that the Medical Board "has long ago given up attempts to regulate the admission of practitioners to the Register of Specialists under *The Medical Acts, 1939 to 1940*, for the simple reason that the presiding judge has failed to distinguish between general competence on the one hand and special knowledge, skill and experience on the other".

The Medical Act was assented to on November 9, 1939, and between that date and January 1, 1942, the Medical Board was compelled, as a result of appeal to the Medical Tribunal, to register a number of medical practitioners as specialists who in the opinion of the Board did not possess the special skill that was required by *The Medical Act*.

This is inevitable when new legislation is introduced to control any profession.

Since January 1, 1942, in addition to having had adequate experience for a period of three to five years in a particular specialty, the time depending on whether the experience was gained in hospital or practice, an applicant for registration must possess a diploma in that specialty. In most cases the regulations governing the eligibility to sit for the diploma ensure that the candidate has had the special experience required by the act. The Medical Board is of the opinion that the applicants registered since January 1, 1942, have been registered on their merits.

It is considered that the law governing the registration of specialists has served a useful purpose and that in the future its beneficial effects will be still more evident than at present.

Yours, etc.,

A. FRYBERG,
President, Medical Board of
Queensland.

Brisbane,
August 17, 1948.

STANDARDS AT THE UNIVERSITY OF SYDNEY MEDICAL SCHOOL.

SIR: I was interested to read in THE MEDICAL JOURNAL OF AUSTRALIA last evening of the correspondence by Sir Alan Newton and Dr. Howard Bullock concerning the number of medical students in Australian universities.

At Oxford the medical school with Nuffield's millions behind it is restricting the number of medical students to 25 per year. The London Hospital, London's biggest, last year had over 3000 applicants for admission to first year medicine and accepted only 60. Similar restrictions occur in every medical school in Great Britain.

Yours, etc.,

F. W. SIMPSON, D.O. (Oxon.),
M.B., B.S. (Adelaide).

Paris,
July 15, 1948.

A PLEA FOR SUMMARIES.

SIR: May I humbly request those writing articles in the journal that where the circumstances are propitious they finish their article with a summary and conclusions—not merely stating that such a problem is discussed or so many cases are reviewed, but a concise statement of what was done, the facts elicited and the conclusions to be drawn therefrom? There are probably others like myself, who have not the time to read nor the capacity to profit from the whole of every article, and a good summary enables us to get some benefit from every article, and to exercise some informed judgement as to which to read right through. May I hasten to add that helpful summaries are appearing now more frequently than they did a few years ago?

Yours, etc.,

ALEXANDER MCQUEEN THOMSON.

118, Canterbury Road,
Middle Park,
Victoria.
August 8, 1948.

TINTED SPECTACLES.

SIR: Under "Current Comment" in your issue of August 7, 1948, there appears an article on "Tinted Spectacles". This article decries, in my opinion unnecessarily, the prescription and wearing of tinted lenses.

The burden of the argument is that lightly tinted lenses offer little more protection against glare than clear glass. Agreed—but that little more, how much it is. In this "blackfellow's country" in which we live, many thousands of people every year complain to their oculists of the irritation and discomfort caused by the glare of the lavishly radiant Australian sun. And many thousands benefit from the prescription of mildly tinted lenses.

The article, in belittling the value of tinted corrections, infers that they are undesirable or even harmful. But where is the harm? Can anyone, including Alfred Cowan, of the United States of America, who is quoted in the article, name any ocular lesion caused or aggravated by tinted lenses?

The article also states that they are dangerous for night driving—but how can this be, if lightly tinted lenses cut off so little light? One cannot have it both ways.

No; if the rays below 400 millimetres, beyond the violet end of the spectrum, irritate your conjunctiva or if the bright white light of the visible spectrum from 700 to 400 millimetres causes a mild reflex spasm of your constrictor iridis muscle, by all means wear tinted spectacles; in my opinion they will not do you the slightest harm.

Of far greater importance is it for the medical profession to instruct such members of the public as are determined to expose their eyes to infra-red radiation at the forthcoming eclipse of the sun, to hasten to obtain the darkest coloured glasses obtainable. For neither rose-tinted glasses nor roseate philosophies are of much comfort if your macula lutea has a hole burnt in it by the focused intensity of solar heat rays.

Yours, etc.,

ARTHUR D'OMBRAIN.

135, Macquarie Street,
Sydney,
August 30, 1948.

AN OPENING AT CARRUM DOWNS.

SIR: There will shortly be available a two-bedroomed cottage on our settlement at Carrum Downs near Frankston. We should like it to be occupied by a retired medical man. We would not require rent, but we would expect the doctor to attend the aged folk on the settlement. At present there are fifteen—all are in good health. We only accept those who are able to look after themselves. Although the majority are pensioners they should be in a position to pay something for medical services. I should be glad to give further details to any who might be interested.

Yours, etc.,

G. KENNEDY TUCKER,
Superior, Brotherhood of Saint Laurence.

65, Brunswick Street,
Fitzroy,
Victoria.
August 10, 1948.

PROGRESS IN PÆDIATRICS.

SIR: I have read with much interest the paper by Dr. Lorimer Dods entitled "Progress in Pædiatrics" which appeared in THE MEDICAL JOURNAL OF AUSTRALIA on June 26, 1948, on page 781. He attributes to Landsteiner and Wiener the detection of the part played by the Rhesus factor in the production of hæmolytic disease of the newborn.

Actually these investigators discovered the Rhesus factor, and it was Levine and his colleagues (see P. Levine, L. Burnham, E. M. Katzin and P. Vogel, *American Journal of Obstetrics and Gynecology*, Volume XLII, 1941, page 925) who first demonstrated that the disease and death of the fetus were due to the iso-immunization of the mother by Rh antigens inherited by the fetus from an Rh-positive father.

Yours, etc.,

CHARLES SWAN.

University of London, Ophthalmic Institute,
Moorfields, Westminster and Central Eye Hospital,
City Road, London, E.C.1,
England.
August 26, 1948.

CANCER.

SIR: The letter of Dr. Herbert H. Schlink on cancer in your issue of August 21 touches on and emphasizes three vital points of public policy. I agree with and support the propositions he has put forward. Modern clinical work on cancer can be done best in the wards of large general hospitals, where all the resources of the profession are available. Real team work is being carried on every day in these institutions, and the results obtained compare favourably with world standards. It would be a far better investment to put whatever money is available into providing more beds and more equipment in existing hospitals than to sink a great sum in building an entirely new and isolated cancer hospital. The Royal Prince Alfred Hospital is most favourably placed for expansion in this direction, as

it is the main teaching centre for both undergraduate and post-graduate students, while at the same time it is closely associated with the scientific departments of the medical school and the university. There are many physicians, surgeons and radiotherapists on the hospital staff who have a very wide and deep knowledge of modern cancer work, and who keep their knowledge up to date by frequent visits overseas to the world's great teaching centres. I would urge that it would be in the best interests of sufferers from cancer for the Hospitals Commission and the Government to use the funds available to them as soon as possible in: (a) expanding the radium centre at the Royal Prince Alfred Hospital and equipping it with the most modern appliances; (b) providing more public beds for early cases of cancer—for a few weeks' delay may mean the difference between success and failure in treatment; (c) providing the associated departments of surgery, pathology and medicine with increased funds for clinical research; (d) making funds available for full publicity in educating the public to come early for treatment, and for adequate follow-up departments, so that patients may be controlled and advised after they leave hospital, and to allow for the compilation of reliable statistics. At present, as Dr. Schlink has pointed out, this is being done with great difficulty and at the expense of the investigator.

Cancer is the great killer. Every day lost in pushing forward with bold schemes costs human lives. And that is a price Australia can ill afford to pay.

Yours, etc.,
F. A. MAGUIRE.

"Hengrove Hall",
193, Macquarie Street,
Sydney.
August 28, 1948.

OTHER WAYS OF DOING THINGS.

SIR: I was very interested to read Dr. Eric Pockley's thoughtful criticism of my views on vision in infants. His contentions may very well be correct, but, unfortunately, some of the evidence he advances does not carry conviction.

In the first place, the reptiles and birds he cites have a visual receptor centre practically wholly restricted to the mid-brain, and in mammals of intermediate status it has been shown that a good deal of visual representation also resides in the mid-brain. One of the main points in my paper was to emphasize the difference between the more automatic mechanism of the mid-brain and the more labile mechanism of the cerebral hemispheres. I feel that it is unsound, therefore, to try to draw a comparison between those animals on the one hand where the mid-brain mechanism is wholly, or still largely, in charge, and on the other hand the human, in which the forebrain has long taken over visual representation almost completely.

Yours, etc.,
A. ABBIE.

Department of Anatomy,
University of Adelaide,
Adelaide.
August 23, 1948.

SIR: In reference to Dr. Eric Pockley's comments (THE MEDICAL JOURNAL OF AUSTRALIA, August 14, 1948) on Dr. Abbie's interesting address, "Other Ways of Doing Things", I feel entirely in agreement with Dr. Pockley when he states that "this reversal on the retina is a matter of pure optics, and this claim leaves out of account altogether the cerebral factor in vision, yet such reversal is constantly quoted as showing that we start life seeing things topsy-turvy". From its very first awareness of objects the infant associates an image falling on point B on the retina, situated below point A on the retina, as derived from an object higher in his visual field than the one giving rise to an image falling on point A.

Illustrating this very broadly, the person with a large detachment of the lower part of his retina complains of a very definite loss in the upper part of his field of vision. Looked at from this angle, I cannot see any reason for any process of mental inversion as the associations are laid down as soon as the cortex can appreciate the boundaries of an object.

Yours, etc.,
WINIFRED R. MANKIN.

151, Macquarie Street,
Sydney.
August 25, 1948.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Film Evening.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that the following films will be shown at the Stawell Memorial Hall of the Royal Australasian College of Physicians, 145, Macquarie Street, Sydney, on Friday, September 24, 1948, at 8 p.m.: "The Surgical Treatment of Carcinoma of the Lower End of the Oesophagus", "Substitution Transfusion in the Treatment of Erythroblastosis Foetalis"; "Yellow Magic", a documentary film.

All members of the profession are invited to attend and further inquiries should be made by communicating with the Secretary of the Post-Graduate Committee in Medicine, 131, Macquarie Street, Sydney. Telephone: B 6980-BW 7483.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 125, of August 19, 1948.

AUSTRALIAN MILITARY FORCES.

Interim Army.

Australian Army Medical Corps.

VX700027 Captain (Temporary Lieutenant-Colonel) J. D. Begg relinquishes the temporary rank of Lieutenant-Colonel and is transferred to the Reserve of Officers (Australian Army Medical Corps) (3rd Military District), 2nd June, 1948.

Active Citizen Military Forces.

Northern Command: Fixed Establishments.

Australian Army Medical Corps (Scientific).—1/39002 Captain W. D. Pryor is appointed from the Reserve of Officers, 1st May, 1948.

Royal College of Surgeons of England.

PRIMARY FELLOWSHIP EXAMINATION.

THE Primary Fellowship Examination of the Royal College of Surgeons of England in anatomy (including normal histology) and applied physiology and the principles of pathology will be conducted in Melbourne and Sydney in February, 1949. The examination will begin with the written papers on Thursday, February 3, 1949. Each candidate will be notified in writing of the result at the termination of the examination.

The examination is open to the following candidates (men or women): (a) those possessing a qualification which is registrable in the British Medical Register; (b) those possessing the medical and surgical degrees of a university recognized by the Council of the Royal College of Surgeons of England for the purpose.

(NOTE.—Unless a candidate's name appears in the British Medical Register a certificate from his university giving the date and description of his medical and surgical degrees must accompany the form of application.)

Copies of the regulations and of the form of application for admission to the examination may be obtained, free of charge, from the Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne. C.1. The fee for admission, or readmission, to the examination is £35 sterling (£43 18s. 6d. Australian currency), which must be sent with the form of application, so as to reach the Secretary of the Royal Australasian College of Surgeons at his office not later than December 18, 1948. Candidates who withdraw from the examination after their entries have been accepted will not be entitled to any refund of the fee for admission.

to the examination unless they produce a medical certificate showing that illness prevented their attendance. The proportion of the fee to be returned in this case is a matter for decision by the Council of the Royal College upon the production of such medical certificate.

With the exceptions noted above, the examination will be conducted in accordance with the published regulations for the Fellowship of the Royal College of Surgeons of England.

Courses in Anatomy, Applied Physiology and Pathology.

The Royal Australasian College of Surgeons will conduct courses in anatomy (including normal histology), applied physiology and the principles of pathology in both Melbourne and Sydney for the Primary Fellowship Examination of the Royal College of Surgeons of England. The courses at both centres will be open to New Zealand candidates.

The course in Melbourne will begin early in October, 1948, and conclude late in January, 1949. It will consist of six sessions per week. The fee for the course is £31 10s. Candidates desiring to enrol for this course must immediately register with the Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1, and at the same time forward the amount of the fee (£31 10s. plus exchange when applicable). Candidates not resident in Melbourne must notify the Secretary of their Melbourne address immediately after arrival. A detailed syllabus is in course of preparation and will be available to all who register for the course.

The course in Sydney will be held in December, 1948, and January, 1949. All inquiries concerning this course should be addressed to the Honorary Secretary of the New South Wales State Committee, Mr. N. R. Wyndham, of 227, Macquarie Street, Sydney, from whom detailed information will be available.

Medical Prizes.

SHORNEY PRIZE.

THE SHORNEY PRIZE, established for the purpose of perpetuating the memory of the late Herbert Frank Shorney, M.D., F.R.C.S., Lecturer in Ophthalmology in the University of Adelaide from 1926 to 1933, will be offered for the second time in 1949. The relevant clauses of the statute are as follows:

3. A post-graduate prize, to be called the Shorney Prize, of the value of £100, shall be awarded to the candidate who in the opinion of the examiners has made the most substantial contribution to knowledge in the subjects of ophthalmology or of diseases of the ear, nose and throat.

4. The recipient must be a graduate of an Australian university.

5. The material submitted for the prize may be either a thesis or published work in medical or scientific literature.

6. Each candidate must declare that the work described is his own.

7. The prize shall be offered for competition from time to time as the accumulations of the fund permit.

8. The prize shall be offered at least twelve months before the last day for the receipt of applications.

9. The prize shall not be awarded on any occasion unless in the opinion of the examiners the material submitted is of sufficient merit.

Applications, accompanied by the evidence which the candidates wish to submit in support, must reach the Registrar, the University of Adelaide, not later than September 30, 1949.

Obituary.

HUGH CORBETT TAYLOR-YOUNG.

We are indebted to Dr. Herbert Schlink for the following account of the career of the late Dr. Hugh Corbett Taylor-Young.

On May 20, 1948, Mr. Taylor-Young died in England, and the gynaecological department of the Royal Prince Alfred Hospital and the profession generally thereby suffered a great loss.

On first coming to Australia, Mr. Taylor-Young practised in Grafton, but soon migrated to Sydney and established himself as a consultant gynaecologist in Macquarie Street.

He and Watson Munro were appointed clinical assistants in gynaecology at the Royal Prince Alfred Hospital in 1901. These positions were abolished in 1902 and Taylor-Young was appointed a junior assistant gynaecological surgeon, which position he held until 1915, when he was raised to the senior staff, and served it with great efficiency until 1920. This later period of his activities was interrupted by World War I, as he joined the Australian Army Medical Corps, and was commanding officer of an army hospital in France.

In 1921 he was made an honorary consultant and retained this position until his death. T.Y., as he was affectionately called, was the writer's first teacher in the out-patient department at Prince Alfred Hospital, and his efforts were tireless in instructing his allotted students in the proper way to examine a female, and the attitude to be adopted if the cooperation of the patient was to be assured. He was cheerful, methodical and had a fund of anecdotes relating to the unusual cases he or others had encountered in the course of a long professional life. His operative dexterity was beyond reproach. He never spared himself and was never in a hurry when conducting his classes and expounding some point in operative technique.

As a man he was most kind-hearted, cheerful and well liked, both at hospital and in his social clubs. Apart from medicine, he had many interests in the business world, and his associates regarded very highly his acumen and common sense.

He was popular with his patients, students, nurses and hospital colleagues, and it will be many a day before his memory fades in the halls and wards of the Royal Prince Alfred Hospital.

We extend to Mrs. Taylor-Young, his sons and family our deepest sympathy in the loss which they have sustained.

ARTHUR CHENERY.

THE following appreciation of the late Dr. Arthur Chenery has been contributed by a practitioner who wishes to remain anonymous.

"The old order changeth, yielding place to new." Such is the melancholy reflection engendered by the announcement of the death of Dr. Arthur Chenery, late of Wentworth, New South Wales, who died on June 6 of this year at the residence of Dr. Harvey Barrett, a son-in-law, in Melbourne. The old order in this instance denoted a general practitioner of a class that unfortunately is rapidly disappearing, and no better example than the late Dr. Chenery could be given. As a man and as a doctor he was cultured, courteous and of unquestioned integrity—subterfuge in any form was abhorrent to him. His work covered necessarily a wide range in all branches of his profession, and whatever the contingency it was always approached with knowledge, enthusiasm and ability, and with the patient's well-being the paramount consideration. He was the family doctor *par excellence* in the full sense of the term, and as such enjoyed the respect, confidence and friendship of those he attended. It was the writer's privilege to be present at a farewell gathering in Wentworth four years ago on the occasion of Chenery's retirement from practice. Seldom have so many people in that district assembled as were gathered together that evening, and seldom have such spontaneous and genuine tributes been accorded to any doctor. All realized that probably they would not see again their trusted doctor, nor could they hope for another of his type and character.

Arthur Chenery was born in Victoria in 1869. He commenced his medical course at the University of Melbourne, completing it at King's College Hospital, where he was, after graduation, house surgeon to Cheyne. He returned to Victoria and practised in various country centres, Sale, Tocumwal, Port Augusta, and finally at Wentworth. During the 1914-1918 war, being unable to serve abroad, he was acting out-patient surgeon at Saint Vincent's Hospital, Melbourne, and carried out *locum tenens* work for some who were abroad.

His interests were always in the country, hence his final change to Wentworth about 1925. There he was able to indulge in his great interest outside his work—ornithology. Nothing gave him greater delight than to "go bush", seeking information concerning birds and their ways. On some trips he was accompanied by the late Dr. MacGillivray, of Broken Hill, another keen ornithologist. Chenery was for a term president of the Royal Australian Ornithologists' Union.

Part of his well-known collection of eggs is in the South Australian Museum.

Chenery's last two or three years were gladdened by the return of his only son, who had been a prisoner of war in Japanese hands. His wife (*née* Turner) predeceased him in 1940, and of his three daughters two married medical men—Frank Ward Farmer, now of Perth, and Harvey Barrett, of Melbourne.

MICHAEL POTIRIS.

We regret to announce the death of Dr. Michael Potiris (late of Leichhardt), which occurred on August 18, 1948, at Randwick, New South Wales.

JAMES CHAMBERS CRAIG.

We regret to announce the death of Dr. James Chambers Craig, which occurred on September 3, 1948, at Melbourne.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Wilson, Eunice Maisie, M.B., B.S., 1944 (Univ. Sydney), Brighton Hotel, Brighton-le-Sands.

Medical Appointments.

Major-General F. Kingsley Norris, of Melbourne, has been appointed honorary physician to the King.

Notice.

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH INFORMATION SERVICE.

READERS are advised that the Council for Scientific and Industrial Research Information Service has changed its address and is now located at the Council's Head Office, 314, Albert Street, East Melbourne, C.2. Telephone: JA 6611.

THE TWELFTH BRITISH CONGRESS OF OBSTETRICS AND GYNÆCOLOGY.

THE Twelfth British Congress of Obstetrics and Gynæcology will be held in the Friends' Meeting House, Euston Road, London, in July, 1949. The president will be Sir Eardley Holland and the honorary secretaries A. Joseph Wrigley and Ian Jackson, 58, Queen Anne Street (the Royal College of Obstetricians and Gynæcologists), London, W.1. The following is the programme.

Wednesday, July 6.—10 a.m.: Opening of Congress by the Minister for Health; "Modern Cæsarean Section", Dr. McIntosh Marshall (Liverpool). 2 p.m.: Guest paper, Dr. Joe Meigs (Massachusetts); "Pregnadiol", introduced by Professor C. F. Marrian (Edinburgh) and Dr. G. I. M. Swyer (London).

Thursday, July 7.—10 a.m.: "Essential Hypertension in Pregnancy", introduced by Professor G. Pickering (London) and Professor F. J. Browne (London). 2 p.m.: "Hernia of the Pouch of Douglas", introduced by Dr. Charles Read (London); "The Management of Pregnancy in Diabetes", introduced by Dr. John Peel (London) and Professor D. M. Dunlop (Edinburgh).

Friday, July 8.—10 a.m.: "Diagnosis and Prognosis of Carcinoma of the Uterus", introduced by Dr. J. E. Ayre (Montreal) and Dr. Spears (Cambridge). 2 p.m.: Discussion on maternal mortality.

Owing to the difficulties that exist at the present time in arranging hotel accommodation, travel *et cetera*, the honorary secretaries would like to have names of those who hope to attend by March 31, 1949, at the latest, and, if possible, very much before that date.

Diary for the Month.

- SEPT. 13.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.
SEPT. 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 15.—Western Australian Branch, B.M.A.: General Meeting.
SEPT. 16.—Victorian Branch, B.M.A.: Executive Meeting.
SEPT. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 22.—Victorian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and book-sellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £2 per annum within Australia, payable in advance. The rates for subscribers outside Australia may be obtained by applying to the Manager.